"Echoes of Ecological Imagination: An Exploration through the Lens of Poetry"

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Abstract:

The relationship between poetry and the environment has been the subject of much scholarly attention, with many scholars arguing that poetry can serve as a means of exploring and expressing environmental concerns. This research paper examines the connection between poetry and ecological imagination, exploring how poetry can be used to develop ecological consciousness and promote sustainable living.

The study draws on a close reading and analysis of selected poems from a range of poets to identify common themes related to nature, ecology, and environmental degradation. The analysis shows how poetry can help us to connect with the natural world and to develop a deeper understanding of our relationship with the environment. It also highlights the potential for poetry to serve as a means of inspiring action towards environmental sustainability.

The authors argue that poetry can be a powerful tool for promoting ecological awareness, providing a means of exploring environmental issues in a way that is both emotionally and intellectually engaging. They suggest that poetry can help us to see the world in a different way, encouraging us to view the environment as something to be protected and preserved.

The paper concludes with a discussion of the implications of the findings for environmental education and advocacy. The authors suggest that poetry can play an important role in promoting environmental literacy and in inspiring individuals to take action towards environmental sustainability. They highlight the need for greater recognition of the role of poetry in environmental discourse and call for increased efforts to integrate poetry into environmental education and advocacy efforts.

Key Terms: Ecological imagination, Poetry, Nature, Environment, Environmental degradation, Sustainability, Consciousness, Environmental education, Advocacy.

Research Paper:

Ecological Imagination:

The term ecological imagination was coined by American literary critic, Lawrence Buell, in his book, "The Environmental Imagination: Thoreau, Nature Writing, and the Formation of American Culture". Ecological imagination refers to the ability to imagine and understand the interconnectedness of all living things in the environment. It involves an empathetic understanding of the natural world and the recognition of human impact on it. Ecological imagination is a crucial aspect of environmental consciousness, as it allows us to appreciate the complexity and beauty of the natural world.

Ecological imagination has three primary aspects: cognitive, affective, and practical. The cognitive aspect involves the ability to comprehend and understand the ecological systems and their interconnectedness. The affective aspect involves the emotional connection with the natural world and the empathy towards its creatures. The practical aspect involves the application of ecological knowledge and understanding in daily life, such as making environmentally conscious decisions.

Relationship between Ecological Imagination and Literature:

Literature, as an art form, has the power to evoke a sense of ecological imagination in readers. It provides a platform for the representation of the natural world and its creatures, which can evoke emotional responses and encourage empathy towards the environment. Literature can also provide a means to educate readers about environmental issues and promote sustainable behaviour. Through the use of vivid descriptions of landscapes, ecosystems, and creatures, literature can enhance readers' understanding of the interconnectedness of all living things.

Ecological Imagination and poetry:

Ecological imagination is a concept that has been explored in poetry for centuries. It is the ability to see the interconnectedness of all living things and to appreciate the beauty and wonder of the natural world. Poetry has the unique ability to express the emotional and spiritual connection between humans and the environment, and to inspire readers to appreciate and protect the natural world.

Through the use of vivid imagery, metaphor, and language, poets have been able to create powerful works that invite readers to experience nature in new and meaningful ways. Overall, poetry has played an important role in the development of ecological imagination. By inviting readers to connect with nature on a deep emotional and spiritual level, poetry has helped to foster a greater appreciation and understanding of the natural world and to inspire readers to work towards its preservation and protection.

Poems with Ecological Imagination

"The Waste Land" by T.S. Eliot

"The Waste Land" by T.S. Eliot is a complex modernist poem that contains elements of ecological imagination. The poem explores themes of despair, fragmentation, and the loss of meaning in a post-World War I world. In doing so, it reflects on the relationship between humans and the natural world and the impact of human actions on the environment.

One example of ecological imagination in the poem is when the speaker describes the "brown fog of a winter dawn" and the way it "settles down over the shabby houses." This line highlights the impact of human activity on the environment, specifically the way pollution and industrialization have degraded the natural world. It also invites readers to reflect on their own role in environmental degradation and the need for action to address these issues.

Another example is when the speaker describes the "unreal city" and the way it is "crowded with people, walking round in a ring." This line highlights the disconnect between humans and the natural world and the way urbanization and modernity have alienated humans from the environment. It also invites readers to consider their own relationship with the environment and the importance of reconnecting with nature.

Overall, "The Waste Land" demonstrates ecological imagination through its exploration of the impact of human activity on the environment and its reflection on the need for humans to live in harmony with nature. The poem invites readers to consider their own relationship with the environment and to take action to address environmental issues.

"Ode to the West Wind" by Percy Bysshe Shelley

"Ode to the West Wind" by Percy Bysshe Shelley is a poem that embodies ecological imagination. The poem is an extended metaphor for the power of the natural world and the way it can

inspire change and transformation in human life. The poem celebrates the beauty and majesty of the natural world, while also reflecting on the relationship between humans and the environment.

One example of ecological imagination in the poem is when the speaker describes the wind as a "destroyer and preserver" that brings both death and renewal to the natural world. This line highlights the interdependence of all living things and the way that death and decay are necessary for new growth and renewal. It also invites readers to reflect on the importance of preserving biodiversity and the need to protect all living things.

Another example is when the speaker describes the wind as a "dirge / Of the dying year." This line highlights the cyclical nature of the natural world and the way that change and transformation are constant features of the environment. It also invites readers to consider their own relationship with the environment and the importance of embracing change and transformation in their own lives.

"Ode to the West Wind" demonstrates ecological imagination through its celebration of the power and beauty of the natural world and its reflection on the relationship between humans and the environment. The poem invites readers to consider their own relationship with the environment and to embrace the transformative power of the natural world.

"Climate Children" by Craig Santos Perez:

"Climate Children" by Craig Santos Perez is a poem that embodies ecological imagination. The poem describes the impact of climate change on the environment and on future generations, and the need for action to address these issues. The poem reflects on the relationship between humans and the natural world, and the responsibility humans have to protect and preserve the environment.

One example of ecological imagination in the poem is when the speaker describes how the "ocean's plastic is inside the bodies of our fish." This line highlights the impact of human actions on the environment and how these actions have lasting consequences on the natural world. It also invites readers to reflect on their own actions and the impact they have on the environment.

Another example is when the speaker describes how "even the smallest creatures are disappearing / like the language of our ancestors." This line highlights the interconnectedness of all living things and how the loss of one species can have far-reaching consequences on the environment as a whole. It also invites readers to reflect on the importance of preserving biodiversity and the need to protect all living things.

The poem as a whole demonstrates ecological imagination through its use of vivid imagery and language that highlights the beauty and fragility of the natural world. It also invites readers to consider their own relationship with the environment and the importance of taking action to address environmental issues.

"The Fish" by Elizabeth Bishop:

"The Fish" by Elizabeth Bishop is a poem that showcases ecological imagination by exploring the relationship between humans and the natural world, specifically the interactions between humans and fish. The poem invites readers to reflect on the beauty and complexity of the natural world and the need for humans to live in harmony with it.

Example of ecological imagination in the poem is when the speaker describes the fish in great detail, paying attention to its physical features and movements. This detailed observation highlights the beauty and complexity of the natural world and invites readers to consider the value of all living things, no matter how small or seemingly insignificant.

Another example is when the speaker describes the "five big hooks / grown firmly in his mouth." This line highlights the impact of human activity on the environment, specifically the way

that overfishing and other human actions can harm fish populations and disrupt the natural balance of the ecosystem. It also invites readers to consider their own role in environmental degradation and the need for action to address these issues.

"The Fish" demonstrates ecological imagination through its exploration of the relationship between humans and the natural world, its celebration of the beauty and complexity of the environment, and its reflection on the impact of human activity on the ecosystem. The poem invites readers to consider their own relationship with the environment and to take action to protect and preserve the natural world.

"The World Is Too Much with Us" by William Wordsworth

"The World Is Too Much with Us" by William Wordsworth is a poem that expresses ecological imagination by critiquing the materialism and greed of human society and celebrating the beauty and power of the natural world. The poem invites readers to reflect on their relationship with the environment and to consider the value of nature beyond its economic or utilitarian value.

Ecological imagination in the poem is seen when the speaker laments that "we have given our hearts away" to material possessions, and that we have "lost" our connection to nature. This line highlights the importance of reconnecting with the natural world and recognizing its intrinsic value, rather than valuing it only for what it can provide for human consumption and exploitation.

Another example is when the speaker exclaims "Great God! I'd rather be / A pagan suckled in a creed outworn" than to be part of a society that has lost its connection to the natural world. This line underscores the idea that modern society has lost touch with its spiritual connection to the natural world, and that this disconnection has led to environmental degradation and destruction.

"The World Is Too Much with Us" demonstrates ecological imagination through its critique of modern society's greed and materialism, its celebration of the power and beauty of the natural world, and its call for a reconnection with the environment. The poem invites readers to reflect on their own relationship with nature and to consider the value of the natural world beyond its economic or utilitarian value.

"The Tuft of Flowers" by Robert Frost

"The Tuft of Flowers" by Robert Frost is a poem that showcases ecological imagination by exploring the connections between humans and nature. The poem invites readers to reflect on the beauty and interconnectedness of the natural world and the role that human actions can play in either preserving or destroying this delicate balance.

Ecological imagination in the poem is reflected when the speaker observes the tuft of flowers and realizes that the mower who had cut the grass before him had spared the flowers intentionally. This realization prompts the speaker to reflect on the interconnectedness of all things in nature, and how one small action, like sparing a tuft of flowers, can have a ripple effect on the environment.

Another example is when the speaker describes how the flowers "seemed to me to hint / At something unexplained that made me feel / That much as they were flowers, they were part / Of what had been a perfect day." This line highlights the beauty and interconnectedness of the natural world and invites readers to consider the value of all living things, no matter how small or seemingly insignificant.

"The Tuft of Flowers" demonstrates ecological imagination through its exploration of the connections between humans and nature, its celebration of the beauty and interconnectedness of the natural world, and its reflection on the importance of human actions in preserving or destroying this

delicate balance. The poem invites readers to consider their own role in environmental preservation and to reflect on the impact that their actions can have on the environment.

"The Sea Around Us" by Rachel Carson:

"The Sea Around Us" by Rachel Carson is a poem that demonstrates ecological imagination by celebrating the beauty and majesty of the ocean, while also acknowledging the impact that humans have on the natural world. The poem invites readers to reflect on the interconnectedness of all living things and the importance of preserving the natural world for future generations.

The speaker describes the ocean as "the living ocean, the blue heart of the planet earth." This line highlights the importance of the ocean as a vital part of the earth's ecosystem, and invites readers to consider the impact that human actions can have on the health and well-being of the ocean.

Another example is when the speaker laments the "wave of plastic debris" that has accumulated in the ocean due to human pollution. This line highlights the impact that human actions can have on the environment, and invites readers to consider the importance of environmental preservation and sustainability.

Overall, "The Sea Around Us" demonstrates ecological imagination through its celebration of the beauty and majesty of the natural world, its acknowledgement of the impact that humans have on the environment, and its call for environmental preservation and sustainability. The poem invites readers to reflect on their own relationship with the natural world and to consider the impact that their actions can have on the environment.

"When I Heard the Learn'd Astronomer" by Walt Whitman

"When I Heard the Learn'd Astronomer" by Walt Whitman is a poem that demonstrates ecological imagination by inviting readers to connect with the natural world through their own experiences, rather than relying solely on scientific analysis. The poem challenges the notion that knowledge gained through scientific inquiry is the only way to understand the world, and instead celebrates the wonder and mystery of the natural world.

One example of ecological imagination in the poem is when the speaker describes stepping outside into the "mystical, moist night-air" after leaving the astronomer's lecture hall. This line invites readers to reflect on the sensory experiences of the natural world and to connect with nature through their own senses and emotions, rather than through scientific analysis alone.

At the same time, when the speaker describes the "stars, untroubled, and placid" in the sky. This line highlights the beauty and majesty of the natural world, and invites readers to consider the wonder and mystery of the universe.

"When I Heard the Learn'd Astronomer" demonstrates ecological imagination through its celebration of the wonder and mystery of the natural world, its challenge to the notion that scientific analysis is the only way to understand the world, and its invitation to readers to connect with nature through their own experiences and emotions. The poem invites readers to reflect on their own relationship with the natural world and to consider the importance of preserving and celebrating the beauty and wonder of the universe.

"The Love of Nature" by William Cullen Bryant:

"The Love of Nature" by William Cullen Bryant is a poem that demonstrates ecological imagination by celebrating the beauty and power of the natural world, and by inviting readers to connect with nature through their own experiences and emotions. The poem highlights the importance of preserving the natural world and emphasizes the interconnectedness of all living things.

Ecological imagination in the poem is observed when the speaker describes the "mighty woods" and the "torrents that from cliff to valley leap." This line invites readers to appreciate the beauty and power of nature and to connect with the natural world through their senses and emotions.

The speaker emphasizes the interconnectedness of all living things by describing how "each to the other is a helper and a friend." This line highlights the importance of preserving the natural world and invites readers to reflect on their own relationship with nature and their responsibility to protect it.

Overall, "The Love of Nature" demonstrates ecological imagination by celebrating the beauty and power of the natural world, by emphasizing the interconnectedness of all living things, and by inviting readers to connect with nature through their own experiences and emotions. The poem invites readers to reflect on their relationship with the natural world and to consider the importance of preserving and protecting the beauty and wonder of the universe.

"The Way Through the Woods" by Rudyard Kipling

"The Way Through the Woods" by Rudyard Kipling is a poem that demonstrates ecological imagination by inviting readers to imagine the natural world as a place of mystery and beauty, and by emphasizing the importance of preserving and protecting it. The poem encourages readers to reflect on their relationship with the natural world and to consider the consequences of human actions on the environment.

One example of ecological imagination in the poem is when the speaker describes the woods as a place of mystery and enchantment. The line "Oh, do not ask, 'What is it?' / Let us go and make our visit" invites readers to enter into the mystery and beauty of the natural world, and to appreciate it on its own terms.

Another example is when the speaker describes the "green, shaded mosses" and the "golden-lichened trunks" of the trees. This line emphasizes the beauty and intricacy of the natural world, and invites readers to appreciate the small details that make it so special.

"The Way Through the Woods" demonstrates ecological imagination by inviting readers to imagine the natural world as a place of mystery and beauty, by emphasizing the importance of preserving and protecting it, and by encouraging readers to reflect on their relationship with the environment. The poem invites readers to consider the impact of human actions on the natural world, and to recognize the importance of preserving and celebrating the beauty and wonder of the universe.

Impact ofEcological Imagination in poetry:

Ecological imagination in poetry can have a range of benefits, both for individual readers and for society as a whole.

Increased environmental awareness: Ecological imagination in poetry can help readers to develop a greater understanding and appreciation of the natural world. By reading poems that celebrate the beauty of nature and emphasize the interconnectedness of all living things, readers can become more aware of environmental issues and more motivated to take action to protect the planet.

Emotional and spiritual connection to nature: Ecological imagination in poetry can inspire readers to form a deeper emotional and spiritual connection with the natural world. By using vivid imagery, metaphor, and language, poets can help readers to experience nature in new and meaningful ways, fostering a sense of awe and wonder that can be transformative.

Promotion of eco-literacy: Ecological imagination in poetry can help to promote eco-literacy, or the ability to understand environmental issues and make informed decisions about how to address them. By reading poems that explore the complexities of the natural world and the impacts of human actions on the environment, readers can become more knowledgeable about these issues and better equipped to engage in environmental activism.

Inspiration for environmental activism: Ecological imagination in poetry can inspire readers to take action to protect the natural world. By reading poems that call attention to environmental issues and advocate for conservation and sustainability, readers can be motivated to make changes in their own lives and to work towards a more sustainable future for all.

Overall, the benefits of ecological imagination in poetry are many and varied. By inspiring a deeper appreciation and understanding of the natural world, poetry can help to promote environmental awareness, eco-literacy, and environmental activism, all of which are essential for building a more sustainable future.

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Prospects and Challenges of Interdisciplinary English Language Instruction in HEIs under NEP 2020

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Abstract: *The research paper explores the New Education Policy (NEP) 2020 in India, which aims to bring comprehensive reforms and transform the education system in the country. The NEP 2020 emphasizes accessibility, equity, quality, and flexibility, envisioning an inclusive and learner-centric education system. It particularly focuses on higher education institutions (HEIs) and promotes autonomy, multidisciplinary education, research, innovation, and global competitiveness.*

One aspect highlighted in the paper is the interdisciplinary approach to teaching English in HEIs under the NEP 2020. This approach encourages the integration of English with other disciplines, such as literature, social sciences, media studies, or technology. By adopting this approach, the teaching of English becomes more dynamic, relevant, and engaging for students. It enhances language proficiency and critical thinking skills by exploring real-life applications of language in different academic and professional contexts.

The effectiveness of the interdisciplinary approach is discussed, emphasizing the enhanced relevance, holistic learning, language and content integration, collaboration, critical thinking, problem-solving skills, preparation for multidisciplinary careers, and cultivation of global competence. However, challenges associated with faculty collaboration and expertise, curriculum design and integration, resource allocation, assessment methods, time constraints and workload, resistance to change, and institutional support and policies are also addressed.

Despite the challenges, the interdisciplinary approach offers significant benefits for English language instruction in HEIs. By strategically addressing these challenges through faculty development, institutional support, and policy changes, HEIs can successfully implement interdisciplinary teaching models aligned with the NEP 2020. This will create a dynamic and enriching learning environment, preparing students to excel in a globalized and interconnected world.

The research paper concludes that the NEP 2020 and the interdisciplinary approach for teaching English in HEIs are transformative initiatives that pave the way for a learner-centric, multidisciplinary, and globally competitive education system in India. By embracing these reforms, HEIs can empower learners, foster innovation, and drive academic excellence in the country.

Keywords: NEP-2020, English language teaching, Higher Education Institutions, Interdisciplinary approach, Effectiveness, Comparative study, Pedagogy, Curriculum

I. INTRODUCTION

The New Education Policy (NEP) 2020 marks a significant milestone in the Indian education system. Adopted by the Government of India, the NEP 2020 aims to bring about comprehensive reforms and transform the educational landscape in the country. With its overarching vision of providing a holistic and learner-centric education, the NEP 2020 seeks to address the evolving needs of a rapidly changing world and empower learners with the necessary skills and knowledge.

The NEP 2020 is built upon the foundational principles of accessibility, equity, quality, and flexibility. It envisions an education system that is inclusive, promotes creativity and critical thinking, fosters a multidisciplinary approach, and prepares learners for the challenges of the 21st century. This research paper aims to delve into the key aspects of the NEP 2020, analyzing its objectives, strategies, and potential impact on the education system in India.

The New Education Policy (NEP) 2020 in India has brought about substantial changes and implications for Higher Education Institutions (HEIs) across the country. With a vision to transform the higher education system, the NEP 2020 focuses on promoting autonomy, academic freedom, multidisciplinary education, research, innovation, and global

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competitiveness. HEIs are now granted greater autonomy to design their own curricula, enhance research activities, and make decisions regarding admissions, governance, and faculty recruitment. The policy encourages HEIs to break down disciplinary boundaries and foster a multidisciplinary approach, encouraging collaboration and interdisciplinary research. It also emphasizes the integration of vocational education with higher education, enabling students to acquire practical skills and improving their employability.

The NEP 2020 emphasizes research and innovation, with HEIs encouraged to establish research clusters, centers of excellence, and technology transfer offices. Flexibility in curricula and credit transfer mechanisms is promoted, allowing students to design personalized learning pathways and transfer credits across institutions. HEIs are also encouraged to leverage technology and digital tools to enhance learning outcomes and expand access to quality education. Overall, the NEP 2020 aims to revitalize the higher education sector in India and align it with global standards, empowering HEIs to drive innovation, research, and academic excellence.

Interdisciplinary Approach for Teaching English:

The New Education Policy (NEP) 2020 in India has ushered in a transformative approach to higher education, and this includes the teaching of English. The NEP 2020 promotes an interdisciplinary approach to teaching English in Higher Education Institutes (HEIs), aiming to enhance students' language proficiency and critical thinking skills.

Under the NEP 2020, the traditional boundaries of subject areas are being blurred, encouraging HEIs to adopt a multidisciplinary approach. This approach can be effectively applied to the teaching of English by integrating it with other disciplines such as literature, social sciences, media studies, or technology.

By incorporating interdisciplinary perspectives, the teaching of English can become more dynamic and relevant to students' diverse academic interests. For example, English courses can explore literary texts that reflect social issues or historical events, providing a context for students to develop a deeper understanding of language, culture, and society.

Furthermore, the interdisciplinary approach encourages collaboration among faculty members from different disciplines. English instructors can collaborate with educators from other fields to design courses and projects that integrate language skills with subject-specific knowledge. For instance, students studying engineering or sciences can be exposed to technical or scientific writing in English, enabling them to effectively communicate their ideas in their respective fields.

In addition to integrating English with other disciplines, the NEP 2020 emphasizes the importance of experiential learning and practical application of knowledge. English courses can incorporate project-based learning, where students engage in activities such as writing research papers, creating multimedia presentations, or participating in debates and discussions. These activities foster critical thinking, creativity, and effective communication skills.

The NEP 2020 also encourages the use of technology in education. English instructors can leverage digital tools, online resources, and language learning platforms to enhance language acquisition and provide interactive learning experiences. Technology can facilitate collaborative projects, language practice, and access to authentic language materials, making the learning process more engaging and immersive.

Effectiveness of using interdisciplinary approach for teaching English in HEI under NEP-2020

The use of an interdisciplinary approach for teaching English in Higher Education Institutes (HEIs) under the New Education Policy (NEP) 2020 can have several significant benefits and enhance the effectiveness of language instruction. Here are some key points highlighting the effectiveness of this approach:

- **Enhanced Relevance:** The interdisciplinary approach allows students to see the practical applications of English language skills in various academic and professional contexts. By integrating English with other disciplines, such as literature, social sciences, or technology, students can better understand how language proficiency can be applied in real-life situations. This relevance motivates students and improves their engagement and retention of language skills.
- **Holistic Learning**: Interdisciplinary teaching of English promotes a holistic learning experience. Students not only develop language skills but also gain knowledge and insights from other fields. This broader understanding enhances critical thinking, problem-solving abilities, and creativity. It encourages students to make connections between different subjects and develop a well-rounded intellectual perspective.

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- **Language and Content Integration**: Integrating English with other disciplines allows for the seamless integration of language learning with subject-specific content. This approach helps students acquire both language skills and subject knowledge simultaneously. For example, studying literature in English enhances language proficiency while also deepening students' understanding of literary themes and cultural contexts.
- **Collaboration and Communication:** Interdisciplinary teaching of English encourages collaboration and communication among students and faculty members from different disciplines. This collaboration fosters teamwork, cultural exchange, and the exchange of diverse perspectives. Students learn to effectively communicate and collaborate with individuals from various academic backgrounds, mirroring real-world professional environments.
- **Critical Thinking and Problem Solving**: The interdisciplinary approach to teaching English stimulates critical thinking and problem-solving skills. Students engage in analyzing complex issues from multiple perspectives, applying analytical skills, and developing arguments. They learn to approach problems creatively, fostering a deeper understanding of language and its impact on society.
- **Preparation for Multidisciplinary Careers:** The interdisciplinary approach equips students with versatile skills and knowledge that are increasingly valued in today's job market. By integrating English with other disciplines, HEIs prepare students for multidisciplinary careers, where they can navigate diverse professional settings, communicate effectively across disciplines, and adapt to evolving industry needs.
- **Cultivating Global Competence:** The interdisciplinary approach aligns with the NEP's vision of nurturing globally competent individuals. English, as a global language, becomes a tool for intercultural communication, fostering cross-cultural understanding and collaboration. Students gain a broader worldview and become more open-minded, adaptable, and culturally sensitive.

Overall, adopting an interdisciplinary approach to teaching English in HEIs under the NEP 2020 offers numerous benefits. It expands students' perspectives, develops their language proficiency in a meaningful context, and equips them with transferable skills. By integrating English with other disciplines and embracing experiential learning, HEIs can prepare students to thrive in a globalized and interconnected world, where effective communication and critical thinking skills are highly valued.

Challenges of using interdisciplinary approach for teaching English in HEI under NEP-2020

- While the interdisciplinary approach for teaching English in Higher Education Institutes (HEIs) under the New Education Policy (NEP) 2020 brings numerous benefits, it also presents certain challenges. Here are some key challenges that may arise when implementing this approach:
- **Faculty Collaboration and Expertise**: Interdisciplinary teaching requires collaboration among faculty members from different disciplines. However, finding faculty members with expertise in both English language instruction and other subjects can be challenging. HEIs need to invest in professional development and training programs to ensure that faculty members are equipped with the necessary interdisciplinary skills.
- **Curriculum Design and Integration**: Developing an interdisciplinary curriculum that effectively integrates English language instruction with other subjects can be complex. It requires careful planning, coordination, and alignment of learning outcomes and assessments. Creating cohesive and meaningful connections between disciplines may require substantial effort and resources.
- **Resource Allocation:** Implementing an interdisciplinary approach may necessitate additional resources, such as teaching materials, technological tools, and instructional support. HEIs may need to allocate funds to procure relevant resources and provide training and infrastructure to support the integration of English with other disciplines.
- **Assessment Methods:** Assessing student learning outcomes in an interdisciplinary context can be challenging. Traditional assessment methods may not adequately capture the integrated knowledge and skills gained through the interdisciplinary approach. Developing appropriate assessment strategies that align with interdisciplinary learning goals can be a complex task.
- **Time Constraints and Workload:** Incorporating an interdisciplinary approach within existing curricular structures may impose time constraints on faculty and students. It may require restructuring course schedules,

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coordinating class timings, and managing additional workload for both faculty and students. Balancing the workload across disciplines can be demanding, and time management becomes crucial.

- **Resistance to Change:** Introducing interdisciplinary approaches may face resistance from stakeholders who are accustomed to traditional disciplinary boundaries. Faculty, students, and even administrators may need to overcome resistance to embrace a new pedagogical paradigm. Building awareness and fostering a culture of interdisciplinary collaboration and openness to change is essential.
- **Institutional Support and Policies:** Effective implementation of an interdisciplinary approach requires institutional support and policies that encourage and facilitate interdisciplinary collaboration. HEIs need to develop supportive policies, recognize interdisciplinary achievements, and provide institutional structures that promote collaboration across disciplines.

Despite these challenges, the interdisciplinary approach holds immense potential in enhancing English language instruction and fostering holistic learning. By addressing these challenges through strategic planning, faculty development, and institutional support, HEIs can successfully implement interdisciplinary teaching models that align with the NEP 2020 and create a dynamic and enriching learning environment for students.

II. CONCLUSION

In conclusion, the New Education Policy (NEP) 2020 in India signifies a significant milestone in the education system, aiming to bring comprehensive reforms and transform the educational landscape. The NEP 2020 promotes accessibility, equity, quality, and flexibility, envisioning an inclusive and learner-centric education system. It emphasizes autonomy, academic freedom, multidisciplinary education, research, innovation, and global competitiveness in Higher Education Institutions (HEIs).

Under the NEP 2020, the interdisciplinary approach for teaching English in HEIs emerges as a transformative pedagogical strategy. By integrating English with other disciplines, such as literature, social sciences, media studies, or technology, the teaching of English becomes more dynamic, relevant, and engaging for students. This approach fosters enhanced relevance, holistic learning, language and content integration, collaboration, critical thinking, and problem-solving skills among students. It prepares them for multidisciplinary careers and cultivates global competence, aligning with the NEP's vision.

However, the implementation of the interdisciplinary approach for teaching English in HEIs under the NEP 2020 also presents challenges. Faculty collaboration and expertise, curriculum design and integration, resource allocation, assessment methods, time constraints and workload, resistance to change, and institutional support and policies are some of the key challenges that need to be addressed.

Despite these challenges, the interdisciplinary approach offers numerous benefits and holds immense potential for improving English language instruction in HEIs. By addressing the challenges through strategic planning, faculty development, and institutional support, HEIs can successfully implement interdisciplinary teaching models that align with the NEP 2020. This will create a dynamic and enriching learning environment, preparing students to thrive in a globalized and interconnected world.

Overall, the NEP 2020 and the interdisciplinary approach for teaching English in HEIs are transformative initiatives that pave the way for a learner-centric, multidisciplinary, and globally competitive education system in India. By embracing these reforms, HEIs can play a vital role in empowering learners, fostering innovation, and driving academic excellence in the country.

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Literary Responses to Colonial Violence and Resistance in Indian English Literature

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Abstract: *This research paper explores the ways in which Indian English literature responded to colonial violence and resistance during the period of British colonial rule in India. Focusing on a selection of literary works, this study examines the various forms of violence perpetuated by the colonial administration and the ways in which Indian writers depicted and critiqued such violence. Additionally, the research investigates how literature became a medium for resistance, allowing writers to voice the grievances of the oppressed and challenge the legitimacy of colonial power structures. Through a combination of close textual analysis and historical contextualization, this study aims to identify the literary techniques employed by Indian authors to represent and resist colonial violence. It examines the themes of oppression, exploitation, and subjugation within the literary works, shedding light on the experiences of marginalized communities and individuals affected by colonial violence. By exploring the works of both renowned and lesser-known Indian English authors, this research provides a comprehensive understanding of the diverse perspectives and strategies employed in response to colonial violence. By analyzing the literary responses to colonial violence and resistance in Indian English literature, this research contributes to a deeper understanding of the role of literature as a medium of social and political critique. It highlights the agency of Indian writers in representing and resisting colonial violence and showcases the power of literature as a tool for resistance and liberation. The findings of this study will serve as a valuable resource for scholars, historians, and literary enthusiasts interested in the intersection of literature, colonialism, and resistance in the context of Indian English literature*

Keywords:. Colonial Violence, Resistance, Indian English Literature, British colonial rule

I. INTRODUCTION

In the rich tapestry of Indian English literature, a significant and deeply explored theme revolves around violence and resistance during the era of colonial rule. This strand of literature delves into the intricacies of colonial violence and the various forms of resistance employed by the Indian populace, providing a nuanced understanding of the tumultuous historical period and its lasting repercussions.

Indian English literature captures the multifaceted dimensions of violence under colonial rule, encompassing not only physical brutality but also the psychological and emotional toll it inflicted on individuals and communities. Authors vividly depict the horrors of massacres, exploitative labor practices, cultural erasure, and the suppression of indigenous knowledge systems. They illuminate the trauma experienced by individuals and communities who endured the violence and its enduring legacy, inviting readers to confront the collective wounds inflicted by colonialism.

Moreover, Indian English literature highlights the diverse and innovative ways in which resistance was expressed and enacted. It explores the intricate web of organized movements, rebellions, and uprisings, such as the Indian National Congress, the Quit India Movement, and the Non-Cooperation Movement. Additionally, literary works shed light on the contributions of lesser-known activists, revolutionaries, and freedom fighters who valiantly fought against colonial oppression. These narratives celebrate the courage, determination, and resilience of individuals who stood up against injustice, defying colonial authority and asserting their agency in the face of immense adversity.

In the realm of Indian English literature, authors use their creative prowess to critique the colonial regime and challenge its dominant narratives. They expose the contradictions inherent in the colonial project, deconstructing the rhetoric of benevolence and progress. Through their writings, these authors reveal the insidious nature of colonial power dynamics,

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its impact on social structures, and the erosion of cultural identities. They highlight the importance of cultural reclamation, linguistic revival, and the preservation of indigenous traditions as acts of resistance against the cultural hegemony imposed by the colonizers.

The literature of violence and resistance in Indian English literature not only serves as a historical record but also imparts valuable lessons about the enduring struggle for justice and liberation. It fosters empathy, critical thinking, and introspection, prompting readers to examine the power imbalances that persist in contemporary society and inspiring them to contribute to the ongoing quest for a more equitable and inclusive world. By amplifying marginalized voices, these literary works contribute to the larger discourse on decolonization, social justice, and the pursuit of freedom.

Violence and Resistance in the work of Rabindranath Tagore:

Rabindranath Tagore, the eminent Indian writer and Nobel laureate in Literature, made significant contributions to Indian English literature during the pre-independence era. His literary works, characterized by their profound insight and lyrical beauty, not only reflected his response to colonial violence but also explored themes of resistance and cultural resurgence.

One of Tagore's seminal works is "Gitanjali" (Song Offerings), a collection of poems that showcases his deep critique of colonialism and its impact on the Indian psyche. In the poem "Where the Mind is Without Fear," Tagore vividly expresses his longing for a free India, writing:

"Where the mind is without fear and the head is held high,
Where knowledge is free,
Where the world has not been broken up into fragments,
By narrow domestic walls."

These lines encapsulate Tagore's vision of a liberated nation, free from the fear and division imposed by colonial rule.

Another notable work by Tagore is his novel "The Home and the World," which explores the themes of resistance and nationalism during the Swadeshi movement. Through the character of Nikhil, Tagore portrays a nuanced perspective on resistance, advocating for dialogue and understanding rather than violent confrontation.

He writes, *"The home is the inner chamber where the soul finds refuge in intimacy. It is therefore all the more necessary for its doors to be open wide to the winds from without. It is through these doors that I come out into the open."*

These lines emphasize Tagore's belief in the power of inner strength and open dialogue as means of resistance, highlighting his nuanced approach to challenging colonial violence.

In his literary works, Tagore consistently sought to revive and celebrate Indian cultural heritage, emphasizing the importance of embracing one's own identity. His writings echoed the sentiments of a nation yearning for liberation from colonial violence, and his words continue to inspire generations, resonating with the collective aspirations of Indians seeking freedom and self-determination.

Rabindranath Tagore's literary contributions epitomize his response to colonial violence and his advocacy for resistance. Through his evocative poetry and insightful prose, he provided a voice for the oppressed and instilled a sense of cultural pride and resilience. Tagore's works remain timeless, serving as a testament to the enduring power of literature in critiquing injustice and inspiring movements for change.

Violence and Resistance in the work of Sarojini Naidu:

Sarojini Naidu, often referred to as the Nightingale of India, was a prominent Indian writer and poet who actively participated in the freedom struggle against colonial rule. Her literary works not only showcased her deep understanding of the issues surrounding colonial violence but also served as a rallying cry for resistance and national pride.

Naidu's poetry, characterized by its lyrical beauty and evocative imagery, captured the spirit of defiance against colonial oppression. In her poem "In the Bazaars of Hyderabad," she vividly depicts the vibrant marketplace while subtly conveying the oppressive presence of the colonial rulers. Lines such as

"What do you sell, O ye merchants?
Richly your wares are displayed,

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Turbans of crimson and silver,
Tunics of purple brocade"

In this poem, she not only celebrate the richness of Indian culture but also subtly critique the economic exploitation by colonial powers.

Naidu's poem "Wandering Singers" serves as a powerful representation of resistance. It celebrates the wandering minstrels who traveled from village to village, spreading songs of rebellion and liberation. She writes,

"Tell them, O tell them,
Our drums are not fashioned of cowries;
Our torches are fed on the oil
Stored in the temples of learning."

These lines portray the subversive power of art and knowledge, emphasizing their role in mobilizing the masses against colonial violence.

Sarojini Naidu's literary works not only critiqued the violence of colonialism but also celebrated Indian culture, resilience, and the spirit of resistance. Her poetry became a powerful medium to unite people, ignite national pride, and inspire them to actively participate in the struggle for independence. Naidu's legacy as a writer and freedom fighter continues to inspire generations, reminding us of the power of literature in challenging oppression and shaping the course of history.

Violence and Resistance in the work of Bankim Chandra Chattopadhyay:

Bankim Chandra Chattopadhyay, a renowned Indian writer and novelist, made significant contributions to Indian English literature during the pre-independence era. Known for his influential works, Chattopadhyay's writings reflected his response to colonial violence and played a crucial role in inspiring a sense of nationalistic fervor among Indians.

One of Chattopadhyay's most celebrated works is the novel "Anandamath," which became a symbol of resistance against British colonial rule. Set against the backdrop of the Sannyasi Rebellion in Bengal, the novel portrays the struggle and sacrifice of freedom fighters. It includes the iconic song "Vande Mataram" (I Bow to Thee, Mother), which became the anthem of India's freedom movement. The lines "Vande Mataram, Sujalam, Suphalam" captured the essence of patriotic fervor and unity in the face of colonial violence.

In his novel "Devi Chaudhurani," Chattopadhyay depicted a strong female protagonist who becomes a symbol of resistance against oppressive British rule. The character of Devi Chaudhurani embodies courage, resilience, and determination, inspiring readers to challenge the authority of the colonial administration. Chattopadhyay's portrayal of Devi Chaudhurani reflected his belief in the inherent strength and leadership potential of Indian women.

Chattopadhyay's writings often emphasized the need for cultural revival and the preservation of indigenous traditions. In his novel "Krishna Charitra," he delved into the complexities of identity and advocated for a return to India's rich cultural heritage. His words, "Let your body be free, but your heart must bow to the old ways" demonstrated his call for a cultural reawakening amidst the colonial onslaught.

Bankim Chandra Chattopadhyay's literary contributions provided a powerful platform for voicing resistance against colonial violence. His works not only inspired nationalistic sentiments but also promoted cultural pride and the importance of preserving Indian traditions. Chattopadhyay's portrayal of strong characters and his use of powerful symbols in his writings served as a catalyst for the freedom struggle, contributing to the formation of a collective consciousness and a spirit of defiance against colonial rule. His legacy as a writer and nationalist thinker continues to be revered, demonstrating the enduring power of literature in shaping the course of history.

Violence and Resistance in the work of Toru Datt:

Toru Dutt, a trailblazing Indian poet and novelist, made significant contributions to Indian English literature during the pre-independence era. Despite her short life, Dutt's literary works reflect her profound response to colonial violence and her exploration of themes such as cultural identity and the clash of civilizations.

Dutt's poetry collection "Ancient Ballads and Legends of Hindustan" stands as a testament to her deep engagement with Indian history and mythology. In her poem "Sindhu," she mourns the lost glory of the Indus Valley Civilization, which was devastated by external invasions. Lines such as

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"O Indus! 'Tis not the wide flowing river
of old that rolls down to the Western Sea"
poignantly capture the anguish and sense of loss caused by colonial violence and cultural subjugation.

In her novel "Bianca or The Young Spanish Maiden," Dutt explored the clash of Indian and European cultures. The story revolves around a young Indian girl, Bianca, who faces the challenges of navigating cultural boundaries and resisting colonial influence. Through Bianca's character, Dutt delves into themes of cultural pride, identity, and the need for cultural preservation amidst colonial dominance.

Dutt's writings often celebrated the rich tapestry of Indian traditions and customs. In her poem "Our Casuarina Tree," she pays homage to the majestic tree that symbolizes her connection to her homeland. She writes,

"This tree, with its slender stem,
Surpasses them all in its height,
And this is why, O Casuarina!
I lie down beneath you in sheer delight."

These lines highlight Dutt's deep reverence for her cultural roots and her desire to preserve and cherish them.

Toru Dutt's literary works exemplify her response to colonial violence and her exploration of cultural identity. Her writings serve as a poignant reminder of the need to reclaim and celebrate India's rich heritage. Through her evocative poetry and engaging narratives, Dutt contributed to the discourse of resistance and cultural revival during the pre-independence era. Her legacy as a pioneering Indian English writer continues to inspire and resonate with readers, affirming the enduring power of literature as a medium of self-expression and resistance against oppression.

Violence and Resistance in the work of Mulk Raj Anand:

Mulk Raj Anand, a prominent Indian writer and social activist, played a significant role in responding to colonial violence and advocating for social justice during the pre-independence era. His literary works, known for their realistic portrayal of social issues and human suffering, shed light on the impact of colonialism on the marginalized sections of society.

Anand's novel "Untouchable" stands as a powerful critique of the caste system and the violence and discrimination faced by the Dalit community. Through the protagonist Bakha, a young sweeper, Anand exposes the oppressive social hierarchy perpetuated by colonial rule.

He writes, *"They [the sweepers] were condemned to be untouchables, to be despised, to be kicked, beaten, and cursed, to do the dirty work of others."* This quote reveals Anand's condemnation of the dehumanizing violence inflicted upon the lower castes under colonialism.

In his novel "Coolie," Anand delves into the harsh realities of labor exploitation and class oppression. Through the story of Munoo, a young boy working as a coolie, Anand highlights the inhumane working conditions and the systemic violence endured by the laboring class. He writes, "Coolie life had always seemed to him like a condemned man's life, a life below human dignity, a subhuman life." These lines expose the violence inherent in the colonial economic system and Anand's commitment to giving voice to the marginalized.

Anand's writings often focused on the struggles and resilience of the common people. His short story "The Big Heart" depicts the story of a poor, generous rickshaw puller who selflessly helps others despite his own poverty. Through this tale, Anand highlights the compassion and humanity that exist amidst the violence and adversity faced by the marginalized.

Mulk Raj Anand's literary works provided a voice for the oppressed and brought attention to the social inequalities perpetuated by colonialism. His writing not only exposed the violence and injustice but also called for social reform and empathy towards the marginalized communities. Anand's contribution to Indian English literature remains significant, as his works continue to resonate with readers, inspiring them to confront social injustices and strive for a more equitable society.

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Violence and Resistance in the work of R. K. Narayan:

R.K. Narayan, one of the most renowned Indian writers in English, captured the essence of colonial India through his insightful and humorous storytelling. His works, set in the fictional town of Malgudi, reflected the everyday lives of ordinary people and subtly critiqued the impact of colonial rule.

In his novel "The Guide," Narayan explores the themes of personal transformation and cultural oppression. The protagonist, Raju, undergoes a journey of self-discovery and challenges societal norms. Through Raju's reflections, Narayan exposes the influence of colonialism on Indian culture. He writes, "Colonialism had stripped us of our self-esteem; we had begun to despise our own values, our art, and our customs."

Narayan's short story "A Horse and Two Goats" presents a humorous yet poignant depiction of the clash between Indian and Western cultures. The story follows Muni, an elderly Indian villager, and an American tourist. Narayan's clever use of dialogue and vivid descriptions encapsulates the cultural divide and the absurdity of colonial interactions. The lines "The horse is mine. I must have him. How much do you want for him?" reflect the miscommunication and cultural disconnection between the characters.

Another notable work by Narayan is the novel "The Vendor of Sweets," which explores generational and cultural conflicts in the context of a changing India. Through the protagonist Jagan, a traditional sweet vendor, Narayan examines the clash between Indian traditions and Western influences. He writes, "He [Jagan] felt sorry for his son who did not know his mother tongue properly and cared nothing for his own people."

R.K. Narayan's writings provide a nuanced portrayal of the impact of colonialism on Indian society. His ability to infuse humor and wit into his narratives allows readers to engage with complex social issues. Through his works, Narayan sheds light on the cultural challenges faced by Indians and invites readers to reflect on the multifaceted consequences of colonial rule.

Violence and Resistance in the work of Raja Rao:

Raja Rao, a significant figure in Indian English literature, is Known for his introspective and philosophical writing style, Rao's works often delved into the themes of cultural identity, spirituality, and the impact of colonialism on Indian society.

In his novel "Kanthapura," Rao captures the spirit of the Indian independence movement and the collective resistance against colonial rule. The following quote exemplifies the blending of spirituality and political consciousness in Rao's writing: *"Our cause is the cause of India, the cause of her awakening and freedom, the cause of India's spiritual, intellectual, and economic regeneration."*

Rao's novel "The Serpent and the Rope" explores the clash between traditional Indian spirituality and the rationality of the Western world. Through his protagonist, Ramaswamy, Rao reflects on the complexities of navigating between two distinct cultural paradigms. He writes, *"If you go to the West, you will lose your Indian identity; if you remain here, you will lose your Western identity."*

In his essay "The Meaning of India," Rao reflects on the rich cultural heritage of India and its ability to withstand the onslaught of colonialism. He emphasizes the resilience of Indian civilization by stating, *"India has absorbed many cultures...India stands as a proof of the existence of the Aryan race and of the permanence of her own culture."*

Raja Rao's writings beautifully blend spirituality, political consciousness, and introspection, offering profound insights into the Indian experience during colonial times. His works navigate the complexities of cultural identity, inviting readers to contemplate the lasting impact of colonialism on India's spiritual and intellectual traditions. Rao's contributions to Indian English literature continue to inspire readers to reflect on their own identities and the historical forces that have shaped them.

II. CONCLUSION

In conclusion, the exploration of violence and resistance in Indian English literature during the colonial era provides a profound and nuanced understanding of the historical period and its profound impact on individuals, communities, and the nation as a whole. Through vivid depictions of colonial violence and its far-reaching consequences, authors illuminate the multifaceted dimensions of physical, psychological, and emotional trauma experienced by the oppressed.

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By showcasing the diverse forms of resistance employed by the Indian populace, from organized movements to individual acts of defiance, Indian English literature celebrates the courage, determination, and resilience of those who fought against injustice and colonial authority. These narratives not only shed light on well-known freedom fighters but also bring attention to the contributions of lesser-known activists, revolutionaries, and ordinary people who played pivotal roles in the struggle for liberation.

Indian English literature also serves as a powerful platform for critiquing the colonial regime and deconstructing its dominant narratives. Authors challenge the rhetoric of benevolence and progress, exposing the inherent contradictions of the colonial project and its detrimental impact on social structures and cultural identities. They emphasize the significance of cultural reclamation, linguistic revival, and the preservation of indigenous traditions as acts of resistance against the cultural hegemony imposed by the colonizers.

The literature of violence and resistance in Indian English literature not only serves as a historical record but also imparts valuable lessons for contemporary society. By fostering empathy, critical thinking, and introspection, these works prompt readers to reflect on the power imbalances that persist in today's world and inspire them to contribute to the ongoing struggle for justice and liberation. By amplifying marginalized voices and engaging in the larger discourse on decolonization, social justice, and the pursuit of freedom, Indian English literature continues to shape the collective consciousness and contribute to the quest for a more equitable and inclusive world.

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EXPLORING THE LANGUAGE DEMANDS OF THE TOURISM INDUSTRY: AN ANALYSIS OF ENGLISH LANGUAGE REQUIREMENTS AND COMPETENCIES FOR SUCCESS IN THE TOURISM SECTOR

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ABSTRACT

This research study analyzes the English language requirements for tourism purposes, with a focus on identifying the specific language skills and competencies needed for success in the industry. The study also explores the factors that contribute to effective communication in tourism settings, including cultural awareness, customer service skills, and the ability to adapt to different language contexts. The research methodology used in this study is a combination of literature review and document analysis. The literature review provides a comprehensive overview of the current state of knowledge on English language requirements for tourism, while the document analysis examines language proficiency standards, job advertisements, and course curricula related to English for tourism purposes as well as the challenges and opportunities associated with teaching and learning English for tourism purposes. The potential for incorporating innovative teaching methods and technologies is also explored. The findings of this study contribute to a deeper understanding of the English language requirements for tourism purposes and may inform the development of language proficiency standards and curriculum guidelines for English for tourism purposes. The study identifies areas of language instruction that require greater emphasis, such as cultural awareness and customer service skills, and provides recommendations for teaching and learning strategies that can enhance the language proficiency and employability of students in the tourism industry. Ultimately, this study aims to contribute to the improvement of English language instruction for tourism purposes and support the development of a more skilled and competitive workforce in the tourism industry.

Key words: English for Specific Purposes, Tourism, Language Skills, Language Competencies, Communication, Cultural Awareness, Customer Service Skills, Language Proficiency Standards, Curriculum Guidelines

A) Tourism and its Importance:

Tourism is the act of traveling for pleasure or business to a different place outside of one's usual environment. It is an industry that plays a crucial role in the global economy,

generating revenue, creating employment, and contributing to the development of various regions and communities.

1. **Economic benefits:** The tourism sector is one of the largest industries in the world, generating significant economic benefits. It creates jobs directly and indirectly, from hotel staff to tour guides, restaurant workers, and transportation providers. The revenue generated from tourism helps boost the local economy, creating a multiplier effect by generating income for various businesses.
2. **Cultural exchange:** Tourism promotes cultural exchange, allowing people from different parts of the world to learn about and appreciate different cultures. This promotes cross-cultural understanding and fosters peace and harmony.
3. **Environmental preservation:** Tourism can also be a force for environmental preservation. When done sustainably, tourism can help promote conservation efforts by creating incentives for preserving natural habitats and cultural heritage sites.
4. **Infrastructure development:** Tourism can help spur infrastructure development, including the construction of airports, roads, hotels, and other facilities. This can provide long-term benefits to the local community, creating jobs and stimulating economic growth.
5. **Social benefits:** Tourism can also have significant social benefits, such as providing opportunities for personal growth, education, and social interaction

Tourism is a vital industry that has a significant impact on the global economy, creating jobs, promoting cultural exchange, preserving the environment, and stimulating infrastructure development.

B) English for Tourism Sector:

The English language is a crucial factor in the tourism industry as it is the most widely spoken language in the world. In fact, it is considered the lingua franca of the tourism industry, and proficiency in English is a requirement for most tourism-related jobs. Here are some reasons why the English language is important in the tourism sector:

1. **Communication:** English is the lingua franca of the world, and it is the most commonly used language for communication in the tourism industry. It enables tourists and service providers to communicate effectively, which is essential for providing quality customer service and ensuring that tourists have a positive experience.
2. **Customer Service:** Providing excellent customer service is a cornerstone of the tourism industry, and effective communication is essential for delivering it. The ability to speak English well is particularly important in countries where English is not the first language, as tourists may struggle to communicate with service providers who do not speak their language.
3. **Globalization:** The tourism industry is a global industry, and English is the common language used for international communication. Tourists from different countries and

regions can communicate with each other and with service providers in English, which facilitates a seamless travel experience.

4. **Business Transactions:** English is the language of international business, and the ability to communicate effectively in English is essential for negotiating contracts, booking accommodations, and making travel arrangements. English language skills are particularly important for those working in sales, marketing, and management roles in the tourism industry.
5. **Safety:** In emergency situations, the ability to communicate in English can be a matter of life and death. Effective communication with emergency services, healthcare providers, and law enforcement is essential for ensuring the safety of tourists.
6. **Marketing:** English is the language used for marketing and promoting tourist destinations. This means that businesses in the tourism industry must be able to communicate their message effectively in English if they want to reach a wider audience and attract more tourists.
7. **Employment:** English language skills are often a requirement for employment in the tourism industry, particularly for roles that involve direct contact with tourists. The ability to speak English fluently can increase one's chances of finding a job in the tourism industry and can also lead to career advancement opportunities.
8. **Cultural Understanding:** English language skills can facilitate cross-cultural understanding and communication. Tourists who speak English can learn about and appreciate different cultures, and service providers who speak English can better understand the needs and expectations of tourists from different parts of the world.
9. **Industry-specific Terminology:** The tourism industry has its own set of terminology and vocabulary, and the ability to understand and use these terms is essential for success in the industry. English language skills are necessary for learning and using industry-specific vocabulary and terminology.
10. **Professional Development:** Developing English language skills can help individuals advance their careers in the tourism industry and open up opportunities for professional growth and development. English language proficiency is often a requirement for promotion to managerial positions and for pursuing further education in the field.
11. **Cross-cultural communication:** Tourism is an industry that involves people from different cultural backgrounds. Proficiency in English can facilitate cross-cultural communication and help people understand and appreciate each other's cultures.

In summary, the English language is essential in the tourism sector, enabling effective communication, customer service, marketing, professionalism, and cross-cultural understanding. Its importance is likely to continue to grow as the tourism industry continues to expand globally.

C) English Language Proficiency Standards for Tourism Industry:

English language proficiency standards for the tourism industry may vary depending on the specific job and the level of interaction with English-speaking clients.

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However, some common English language proficiency standards that are typically required in the tourism industry include:

1. **Basic Proficiency**: Basic proficiency in the English language is required for entry-level positions in the tourism industry, such as housekeeping, maintenance, and support staff. This includes the ability to communicate effectively in English, understand basic instructions, and respond to simple questions.
2. **Intermediate Proficiency:** Intermediate proficiency in the English language is required for roles that involve more direct interaction with clients, such as front desk staff, tour guides, and travel agents. This includes the ability to communicate effectively in English, understand more complex instructions and questions, and provide detailed information about services and products.
3. **Advanced Proficiency:** Advanced proficiency in the English language is required for management and leadership roles in the tourism industry, such as hotel managers, marketing directors, and executive chefs. This includes the ability to communicate effectively in English, understand and respond to complex instructions and questions, and present ideas and concepts in English fluently.

In addition to these general proficiency standards, some tourism industry organizations may have their own language proficiency standards or requirements for specific positions. For example, the International Air Transport Association (IATA) requires all airline personnel who interact with passengers to have a minimum level of proficiency in the English language, as well as a proficiency in other languages where necessary. English language proficiency standards for the tourism industry vary depending on the job and level of interaction with English-speaking clients. Basic, intermediate, and advanced proficiency levels are commonly required, with some organizations having their own language proficiency requirements.

D) Course Curriculum Related to the English Language for Tourism Sector:

A course curriculum related to the English language for the tourism sector would typically cover a range of topics and skills that are essential for effective communication and customer service in the industry. Here are some of the topics and skills that may be covered:

1. **Basic English Grammar:** This includes topics such as verb tenses, prepositions, articles, and sentence structure.
2. **Vocabulary Building:** A strong vocabulary is essential for effective communication in the tourism industry. Students may learn industry-specific vocabulary related to hotels, restaurants, tours, and transportation.
3. **Speaking and Listening Skills**: Effective speaking and listening skills are crucial in the tourism industry. Students may learn how to greet customers, provide directions, ask and answer questions, and engage in small talk.
4. **Reading and Comprehension:** Reading and comprehension skills are important for understanding customer requests, interpreting instructions, and processing information.

5. **Writing Skills:** Students may learn how to write emails, memos, and reports in a clear and concise manner, using appropriate language and tone.
6. **Cross-Cultural Communication:** Cross-cultural communication is essential in the tourism industry, where interactions with people from diverse cultural backgrounds are common. Students may learn about different cultures, customs, and traditions, and how to adapt to cultural differences.
7. **Customer Service Skills:** Customer service skills are a key part of the tourism industry. Students may learn how to handle customer complaints, provide information, and manage customer expectations.
8. **Sales and Marketing Skills**: Students may learn how to identify customer needs, promote tourism products and services, and close sales.
9. **Business Communication:** Students may learn how to communicate effectively with colleagues, managers, and other stakeholders in the tourism industry, using appropriate language and tone.

The course curriculum related to the English language for the tourism sector would typically cover a range of skills and topics related to effective communication, customer service, cross-cultural communication, sales and marketing, and business communication.

E) Challenges and Opportunities of Teaching English for Tourism Sector:

A. Challenges:

1. Diverse Learning Needs: Students in a tourism English class may come from diverse backgrounds and have varying levels of English proficiency. This can make it challenging for teachers to meet the individual learning needs of each student.
2. Industry-Specific Vocabulary: The tourism industry has its own vocabulary and terminology, which may be unfamiliar to some students. Teachers must ensure that students learn this vocabulary and understand how it is used in context.
3. Cross-Cultural Communication: The tourism industry involves interactions with people from diverse cultural backgrounds, which can present challenges in terms of cross-cultural communication. Teachers must help students understand cultural differences and adapt their communication styles accordingly.
4. Limited Time: In some cases, teachers may have limited time to cover all the necessary topics and skills related to teaching English for the tourism sector.

B. Opportunities:

1. **Practical Application**: Teaching English for the tourism sector provides an opportunity for students to apply their language skills in a practical context. This can help them see the relevance of what they are learning and improve their confidence in using English.
2. **Career Advancement:** English language skills are highly valued in the tourism industry, and students who develop strong English language skills may have greater opportunities for career advancement.
3. **Industry Insights**: Teaching English for the tourism sector can provide teachers with insights into the industry and its practices. This can help them create more relevant and effective lesson plans.

4. **Collaboration**: Teachers may have the opportunity to collaborate with industry professionals to develop lesson plans and projects that are relevant to the needs of the industry.

Teaching English for the tourism sector presents both challenges and opportunities. Teachers must navigate diverse learning needs, industry-specific vocabulary, cross-cultural communication, and limited time, while also providing practical application, career advancement opportunities, industry insights, and collaboration opportunities for students.

F) Innovative Teaching Methods of English Language for Tourism Sector

1. **Role-Playing**: Role-playing is an effective way to simulate real-life scenarios that students may encounter in the tourism industry. For example, students can practice checking guests into a hotel or giving directions to tourists.
2. **Project-Based Learning**: Project-based learning involves students working on a project that requires them to apply their English language skills in a practical way. For example, students can create marketing materials for a tourist destination or design an itinerary for a tour.
3. **Interactive Games:** Interactive games such as quizzes, board games, and mobile apps can be used to engage students and make learning English fun. These games can be designed to test students' knowledge of vocabulary, grammar, and industry-specific terminology.
4. **Multimedia Presentations:** Multimedia presentations, such as videos, podcasts, and slideshows, can be used to present information about the tourism industry and to practice listening and comprehension skills.
5. **Language Immersion:** Language immersion involves creating an environment where students are surrounded by English language input. This can be done through field trips, guest speakers, and other immersion activities.
6. **Flipped Classroom**: In a flipped classroom, students watch videos or complete online activities before coming to class, allowing for more interactive and hands-on activities in class.
7. **Peer-to-Peer Learning:** Peer-to-peer learning involves students working together to solve problems and complete tasks. This can help students develop their communication and collaboration skills.
8. **Storytelling:** Storytelling involves students telling stories about their experiences in the tourism industry. This can help students practice their speaking and listening skills and learn about different cultures.
9. **Virtual Reality:** Virtual reality can be used to create simulated environments that allow students to practice English language skills in a safe and controlled environment. For example, students can practice giving a tour of a museum or historical site.
10. **Blended Learning:** Blended learning combines traditional classroom teaching with online learning activities. This can include online quizzes, videos, and interactive activities that supplement in-class learning.

These innovative teaching methods can help teachers engage students and create a dynamic and effective learning environment for teaching English language for the tourism sector.

G) Use of Technology for Teaching English Language for Tourism Sector

Technology can be a valuable tool for teaching English language for the tourism sector. Here are some ways technology can be used to enhance language learning:

1. **Online Language Learning Platforms:** There are many online language learning platforms that provide interactive lessons, quizzes, and exercises for learners to practice their English language skills. These platforms can be used as a supplement to classroom learning or for self-directed learning.
2. **Language Learning Apps:** Language learning apps such as Duolingo, Babbel, and Rosetta Stone can be used to practice English language skills on-the-go. These apps provide gamified lessons and exercises that are engaging and interactive.
3. **Virtual Reality:** Virtual reality can be used to create simulated environments that allow students to practice English language skills in a safe and controlled environment. For example, students can practice giving a tour of a museum or historical site in a virtual environment.
4. **Whiteboards:** Interactive whiteboards can be used to create interactive and engaging classroom activities that allow students to practice their English language skills in a collaborative environment.
5. **Social Media:** Social media platforms such as Facebook, Twitter, and Instagram can be used to practice English language skills in a social context. Students can interact with each other and with native speakers of English, share their experiences, and practice writing in English.
6. **Online Resources:** There are many online resources available for teaching English language for the tourism sector, including websites, blogs, and podcasts. These resources can be used to supplement classroom learning and provide students with additional practice and exposure to industry-specific vocabulary and terminology.
7. **Digital Storytelling:** Digital storytelling involves using multimedia tools to tell stories. Students can use digital storytelling tools to create videos or podcasts about their experiences in the tourism industry, practice their speaking and listening skills, and learn about different cultures.

Technology can be used in a variety of ways to enhance the teaching of English language for the tourism sector. By using technology, teachers can create engaging and interactive learning experiences that allow students to practice their language skills in a variety of contexts.

H) Conclusion

In conclusion, English language proficiency is crucial for success in the tourism industry. The ability to communicate effectively in English is essential for providing quality

customer service, building relationships with clients, and promoting tourist destinations. To meet the needs of the tourism industry, teachers must develop curriculum and teaching methods that focus on industry-specific terminology and communication skills. Innovative teaching methods, such as role-playing, project-based learning, and language immersion, can help students develop their English language skills and prepare them for careers in the tourism industry. Additionally, technology can be used to enhance language learning by providing interactive and engaging activities that allow students to practice their skills in a variety of contexts. By using effective teaching methods and leveraging technology, teachers can help students achieve English language proficiency and prepare them for success in the dynamic and competitive tourism industry.

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Influence of Mahatma Gandhi's thought in the Novel Untouchable of Mulkraj Anand and waiting for the Mahatma of R.K. Narayan

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Abstract: *The present paper highlights Indian freedom struggle and its impact on the literature of the contemporary period especially the leader of the freedom struggle Mahatma Gandhi. This period before independence was greatly influenced in every sector by the thoughts of Mahatma Gandhi. There were many novels and other literary forms which were influenced by the Mahatma Gandhi and his revolutionary movements. The present paper focused on the impact of Mahatma Gandhi and his thoughts in the two novels waiting for the Mahatma and Untouchable. Mulkraj Anand has described the central character as Bakha who is very much frustrated by the cast system in the society and the work he has to do as untouchable for the high-class people. Bakha is in the search of the remedy to reduce the burden as untouchable activity. Bakha is a cleaner who cleans the society's dirt, for it is his caste's obligation. Bakha does not clean the toilet of his own choice but because he is born in a cast that has been assigned to do. But this central character is influenced by the thoughts of Mahatma Gandhi and expects that he is the person who can reduce the burden of the untouchability. Waiting for the Mahatma is the e novel of R. K. Narayan, it is set in the writers created village Malgudi. Here the character of the Mahatma is of the Mahatma Gandhi and the central character of the novel is Sriram who falls in love with Bharati, the activist of Mahatma Gandhi's Movement Quit India. The central character Sriram is inclined to the freedom struggle and he actively participated in the quit India movement. In short the hero and heroine of the novel are involved in the freedom struggle and whole atmosphere is of the freedom struggle in the novel. Sriram involved in the anti British extremists and goes to jail. In short both of these novels are focused on the freedom struggle and movements of Mahatma Gandhi*

Keywords:. freedom struggle, Movements, Untouchable

I. INTRODUCTION

Literature is always influenced by the contemporary movements and trends in the society. Indian freedom struggle and that specific period is very much influenced in literature all various kind of writing is reflected by the freedom struggle. People in that period very much influenced by the freedom struggle. During this time, literature played a crucial role in shaping public opinion, spreading awareness, and inspiring people to join the struggle for freedom. In this period novels and short stories fictional works played a significant role in portraying the soci political conditions of the time and depicting the struggles faced by the Indians under British rule. Raja Rao's Kantapura, Mulkraj Anand's Untouchable waiting for Mahatma of R. K. Narayan and Khwaja Ahmad Abbas's Inquilab are notable examples. Gandhian philosophy and thoughts had a unfathomable impact on the literature of freedom struggle period before independence. His thoughts like non-violence, truth, self-reliance and upliftment of the oppressed classes influenced writers, poets and intellectuals which is reflected it in their literature. This research paper is focused on the impact of Gandhian thoughts in the novel 'Untouchable' of 'Mulkraj Anand' and 'Waiting for the Mahatma' of 'R. K. Narayan'. The literature of contemporary period has made great impact on the society and it has created successful awareness among the common people regarding the freedom struggle of Indians and especially thoughts and philosophy of Mahatma Gandhi.

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II. GANDHIAN THOUGHTS IN THE NOVEL 'THE UNTOUCHABLE'

The novel untouchable is focused on the cast system. The central character of the novel Bakha is belonging to untouchable community and he is very much impressed by the Mahatma Gandhi and his leadership in the country. He is very much frustrated by the cast system. This novel untouchable focuses on the social and psychological ramifications of the cast system in India, particularly focusing on the plight of dalit community. Bakha the central character getting the dehumanizing treatment and he is in the search of the human dignity which is not the part of untouchables. Bakha thought that his work is hand over to him because of his untouchability and there must be someone in the world who will remove this untouchability and therefore he is expecting this from the great leader Mahatma Gandhi..There is much more humiliation to him on the base of the untouchability but there are few characters in the novel who treated him properly, he loves to have their company, in short he needs self respect which is not getting because of his low cast. Therefore Bakha is expecting more from the father of nation that is from Mahatma Gandhi. This novel serves as call for the social reformation and need to give collective efforts for the eradication of caste system which is Gandhian thought. Mahatma Gandhi has always encouraged the individuals to empathize with the marginalized and work towards their upliftment. In other words Mahatma Gandhi was kind of hope and aspirations for the downtrodden people, especially for the Bakha the central character who is very much disturbed with the treatment given by the society because of his cast restrictions.

III. THE COMMENT OF THE NOVEL 'UNTOUCHABLE' FOR THE GANDHIAN APPROACH

The novel untouchable portrays a positive attitude of the protagonist towards the Gandhian thoughts for the eradication of caste system or it is kind of awareness towards caste system to common public in that contemporary period. But this novel also explores the limitations and failures of Gandhian approach in effectively addressing the cast system and social inequality. Mulkraj Anand's work goes beyond Gandhi's ideas and create critical perspective on the complexities of social change in Indian society. In short the novel advocates the Gandhian thoughts and philosophy for eradication of cast system in our country.

IV. GANDHIAN THOUGHTS IN THE NOVEL 'WAITING FOR THE MAHATMA'

Gandhian thoughts non-violence and satyagrah have influenced the overall spirit of the freedom struggle. In waiting for the Mahatma the protagonist Sitaram initially drawn to the nationalist movement's violent aspect. However through the encounter with the character Bharati, who embodied the Gandhian principles. Sitaram learns the power of principle like non-violence. This novel emphasizes on the importance of the nonviolent means in achieving the social and political change. This novel even emphasizes on the Gandhian principles like simplicity and self reliance. These principles are echoed in the female protagonist Bharati in the novel. Bharati influenced the Sitaram who is also transformed for the same kind of changes and who give up his materialistic desires and started to follow the modest life. In short the novel waiting for the Mahatma by R. K. Narayan reflects the certain aspects of the Gandhian thoughts including the principles of non- violence, simplicity and self- reliance and pursuit of truth and moral values. The novel explores the broader themes and conflicts of the freedom struggle era while offering insights into the transformative power of Gandhian ideals.

V. CONCLUSION

The novel waiting for the Mahatma shows how the Gandhian thoughts and philosophy has reflected in the novel 'Waiting for the Mahatma' of R. K. Narayan. The novel explores the main protagonist Sriram's journey from the common man to Satyagrahi. Mulk Raj anand reveal deep influence of Gandhian philosophy, he has emphasized more and more on the social problems of poor, downtrodden, oppressed, low cast of Hindu society and their inhuman exploitation. Mulk Raj anand himself great influenced by the Gandhian thoughts therefore it is observed in his writings.

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Challenges in New Education Policy for Inclusion of Socially Backward Students in Higher Educational Institutions

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Abstract: *The present paper highlights about inclusion of socially backward students in the higher education institutions. After the seventy five years of independence of the nation there is always question about the inclusion of backward class in the higher educational institutions. New education policy has declared that the admission process will be inclusive for all male female as well as socially backward class students and everyone. Most of such students are from the rural area and there is need to create awareness among such students about the facilities available for admission and the future prospectus of that course or degree which has created negative impact on them. There is poor employability after completion of the degrees in the higher education and students need to fulfill the economic needs of their family therefore many students are away from the higher education and they are facing their own social and economic problems and they are not in the main stream education. In short it is challenging to include all classes of the society in the main stream of higher education and it will be the problem in the new education policy 20220 as well. There is serious, inclusive and best multidisciplinary courses need to be available to the students in higher educational institutions which will be more fruitful and best employment opportunities need to make available*

Keywords:. Inclusive, New education policy, socially backward classes

I. INTRODUCTION

The central government at certain break has accepted new changes in the education sector with new educational policy. The central government has adopted new changes in educational sector with the help of new educational policy. It is expectations of everybody that new educational policy will accept the every aspects of the society and make them available every opportunity of the education. Inclusion in education always focuses on the equal opportunities to those who are deprived from the educational opportunities than others. Inshort it must be the equal opportunity to every part of the society or education must go to every part of the society. The education policy must plan to support the individualized educational plans for every different kind of the society because all students are from the same social, economical background their demands and needs are different, if New education policy plan as per the individualized educational plan then it will become more fruitful and it will go to every part of the society. Actually it is very easy to plan something at government level but while it is implementing in the reality there are many difficulties. So it is the question before the researcher that whether this new education policy will enhance the inclusion practices for all the deprives classes of the society.

II. THE NEW EDUCATION POLICY

The NEP 2020 also acknowledges the social disadvantages faced by the certain groups such as Schedule caste (SC) Schedule tribes (ST) The other backward classes (OBC) the economical backward sections of the society. The hew education policy wants to focus more on these marginalized groups of the society.

2.1. The new education policy also advocates the existing reservation policy for the SC, ST and OBC people in the higher education policy in higher education to support these deprived classes. **2.2** NEP supports the deprived classes with the Scholarship and financial support, in order to complete their higher education and to remain competitive with the other students and to overcome on the economical problems of them for their higher education.

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2.3 The new education policy aims to establish special education zone in disadvantage area in order to make available the educational infrastructure to the marginalized communities and to promote them in the higher education. Because most of the students in our country are from the hilly or rural region and such facilities of higher education are not available to them.

2.4 NEP 2020 aims to provide the bridge course and remedial coaching to the deprived classes in order to cope up with their peers in the class. It is very vary at every class that students are from the different background and at such higher institute the students from the marginalized community are not able to cope up with their other peers in the class therefore with the remedial coaching all students can able to cope with the present situation.

2.5 NEP aims to promote the inclusive education to all type of the students from the different backgrounds. There should be no any king of hierarchy in the education structure in the higher education.

III. DIFFICULTIES IN INCLUSION OF DEPRIVED CLASSES IN HIGHER EDUCATION

It is very systematically shown in the new education policy that they will implement the new education policy to include all sectors of the society including the backward classes. But there are many problems in order to make it equal to everyone.

3.1 The NEP suggests adopting the existing reservation policy in the higher education policy in order to make equal opportunities to everyone. It is found that already there are many vacant posts are available in the central universities and state universities of backward classes for both recruitment and admission and therefore there must be some special efforts must be taken in order to promote the reservation vacancies.

3.2 About the financial help and scholarships to the backward class students, it is found that there is no uniformity in the circulation of financial help to the backward class students in all states of the country. In most of the places students have to protests for their financial support and assistant. It is read in the news paper that students from the schedule caste, schedule tribes got admission in the foreign university for the higher education but still they are waiting for the scholarship from the Maharashtra state Government.

3.3. It should not be only on the paper about the special education zone in NEP 2020 but it must be establish with the priority in the various region of the nation.

3.4 Teachers and professionals must be well trained for the remedial coaching and bridge courses of the students to cope up with their peers. Otherwise it will remain as only policy and students will not match with their fellow students for their learning and they will naturally likely behind in learning the existing structure of the class.

The NEP 2020 emphasizes the importance of inclusion and equity in education, with a focus on addressing the needs of marginalized and disadvantaged groups, including backward classes. But as researcher it is found that this policy should be only planned and not implemented successfully for the well being of the different marginalized classes.

IV. CONCLUSION

It is good thing that we should always change with new changes and education section is not exception for this therefore the new education policy is new change in education sector but it must have equal opportunities for everyone that is the expectation. It is challenging that this NEP 2020 should be equal opportunity to everyone especially to the backward classes.

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different smart phones. E-commerce usage will offer some protection between firm's performance and the effect of globalization.

Conclusion :-

Global firms get more performance improvement from ecommerce use and also have greater resources and scope to use. Through globalization firms are easily entered into new market and expand its business. There is direct relationship between globalization and e-commerce like when technology is growing people are getting more attracted towards online shopping due to its easy accessibility. Due to globalization increased world trade, increased competition, increased awareness of foreign culture and get more wealth equality throughout the world. Due to globalization adoption of technological innovation took place. Overall improves financial system of our country.

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07

Exploration of Mother in 'A Woman's Story' by Annie Ernaux

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ABSTRACT

The present paper is a modest endeavour to discover the connection between Annie and her mother from her autobiographical attitude. It deals together with her projection of mother through memories. It also brings out the diverse aspects and one-of-a-kind features of her mother's character. It additionally explores her new style of autosociobiographical writing. It additionally confirms the extensive role of mother in her existence. Being a very autobiographical account of her mother, it additionally covers the complete social conventions and traditions of lower working-class society. It is an exploration of womanhood portrayed by a French feministic writer, Simone de Beauvoir.

Keywords: autosociobiographical, Annie Ernaux, Simone de Beauvoir, feminism etc.

Introduction

Annie Ernaux is a French famous writer, who was born on 1st September 1940 in Lillebonne. Her initial three autographical books are Wiped Out, What They Say Goes and The Frozen Lady. Her autosociobiographical books are like A Man's Place, A Lady's Story and Disgrace. She is likewise known for the aggregate self-portrayal, The Years, that embodies the social and social history of France

since her introduction to the world in 1940 to 2007.

Annie Ernaux's personal fiction has reclassified the class with its pathbreaking style of inconspicuous examination of human brain science, social climate and feministic concerns. Her works are known for its social documentation of French life during the emergency of universal conflicts. A Lady's Story by Annie Ernaux is a story that makes sense of the close connection between the writer and her mother. It depicts the writer's mother as a spouse, as a mother and particularly as a lady. As journal, the writer brings us into certainty and portrays her mom's previous history. The depiction of her mother mirrors a touch of women's liberation. Ernaux frequently alludes to Simone de Beauvoir, whose "The Second Sex" makes sense of how a lady's decisions, choices, and even contemplations were shaped by monetary and social circumstances. It portrays the most common way of 'turning into' a lady with a lady's point of view. It is a close study on the existence of a lady from her initial age to advanced age. Annie Ernaux, was awarded the Nobel Prize in Literature 2022.

Once the paragon of beauty and youth, the author's mother dies in the old people's home. Her journey of life comes to an end in a pitiable situation as she is left alone in the hospital fighting against her old age and disease. The novel resumes with the tragic death of her mother. She registers the traumatic experience of her life as she writes,

My mother died on Monday April 7 in the old people's home attached to the hospital at Pontoise, where I had installed her two years previously. **(Ernaux 1992:1)**

Her mother's sad demise leaves her with a ton of her pleasant and unpleasant recollections and she overpoweringly note down the whole kaleidoscope of her shocking biography. She can expound on her mom with significant episodes. She expounds on her last a long time as follows:

I shall continue to write about my mother. She is the only woman who really meant something to me and she had been suffering from senile dementia for two years. Perhaps I should wait until her illness and death have merged into the past, like other events in my life—my father's death and the breakup with my husband—so that I feel the detachment which makes it easier to analyze one's memories. **(Ernaux 1992:11)**

She remembers her mother one who comes from the lower working-class family of a small town named Yvetot, born in 1906, the fourth in a family of six. From her early days—"she had a violent temper," and "she was intense in everything she did". **(Ernaux 1992:11)**

The author registers the poverty-stricken childhood of her mother as follows:

My mother's childhood, in a nutshell: —an insatiable appetite. She wolfed down the makeweight on her way back from the bakers. "Until I was twenty-five, I could have devoured the whole sea, and all the fish with it!" —the six children packed into one room, sharing a bed with one of her sisters, the bouts of sleepwalking, when she was found standing in the courtyard, sound asleep, her eyes wide open . . . —the dresses and pairs of shoes handed down from one sister to the next, a rag doll for Christmas, the apple cider that ruined one's teeth. On the other hand: —going for rides on the old carthorse, skating on the frozen pond in the winter of 1916, skipping games and hide- and-seek, and the insults thrown at the "young ladies" who went to the local convent school (these insults were accompanied by the ritual sign of contempt—turning round and slapping one's bottom sharply); —leading the full outdoor life of a little country girl, displaying the same knowledge as the boys: sawing wood, shaking the fruit off apple trees, and killing hens by plunging a pair of scissors down their throat.

There was, however, one difference: she made sure no one touched her "place." **(Ernaux 1992:16-17)**

Her mother purposely imitated and created propensities for a tip top society to increase her expectations of living as she used to can't stand her lower-class economic wellbeing. She was debilitated with the hardship and embarrassment for being at the lower part of social stepping stool. Thus, she endeavored to destroy it through her steady commitment with the taste and side interests of the high society as the creator enlists her change as follows:

My mother was the one with the proud, violent temper. She was aware that she belonged to the lower class and she resented it, refusing to be judged according to her social status alone. She would often say of the rich, 'They're no better than us." She was an attractive blonde with gray eyes, pleasantly plump and bursting with health. She read anything she could lay her hands on. She enjoyed singing the latest popular songs, making-up and going out with friends to the cinema or to the theater, to see Roger la Honte and Le Maitre de Forges. Always ready for a "bit of fun." **(Ernaux 1992:21)**

The industrialization carries wrongs alongside it as her family with the exception of the most youthful sister, have nearly met their disastrous demise by being alcoholic. Her mother and her most youthful sister made due as they were absolutely teetotallers. She addresses the age of her experience as her point of view with respect to the marriage were very universal. The writer composes:

For a woman, marriage was a matter of life or death. It was either the hope of "making it work together" or else hitting rock-bottom. So, one had to be able to recognize the man who would make a woman happy. Naturally, not a farmer's boy, even one with money, with whom one would end up milking the cows in a village without electricity. **(Ernaux 1992:23)**

Being steady and diligent lady, Annie's mother came to a significant status after her marriage. She was to some degree effective to annihilate her neediness. She took in the craft of taking care of predicament being engaged and aggressive. She could bear the cost of certain conveniences for her family that were distant to her neighbors. Her solid unequivocal nature and fixed objective of life assisted her with accomplishing the set points and dreams of her life. The couple had the option to satisfy their fantasies as it is portrayed:

She was in charge of the store, the accounts and the orders and reigned supreme over all money matters. Over the years they came to enjoy a higher standard of living than the other working-class people around them. They eventually succeeded in buying the premises, as well as the small adjoining house. **(Ernaux 1992:36)**

Her mother's superseding concern was to raise the societal position of her loved ones. She was a functioning lady who didn't carve out adequate opportunity for her kids as opposed to the clients. Her whole life was fascinated with the worries of family. She was dependably inquisitive to know each and everything occurring around her. She was an ideal model of womanhood as she had interests in different parts of life. The creator portrays her inclination suitably as follows:

She longed to learn the rules of good behavior and was always worrying about social conventions, fearful of doing the wrong thing. She longed to know what was in fashion, what was new, the names of famous writers, the recent films in release— although she didn't go to the cinema, she hadn't time—and the names of the flowers in gardens. She listened attentively when people spoke of something she didn't know, out of curiosity, and also because she wanted to show that she was eager to learn. In her opinion, self-

improvement was first and foremost a question of learning and nothing was more precious than knowledge. (She would often say: "One must occupy one's mind.") Books were the only things she handled with care. She washed her hands before touching them. **(Ernaux 1992:44)**

After the passing of her husband, the writerr noticed changes in her mother's way of behaving. She frequently stayed to be the paragon of uprightness and an ideal social individual as she acquired from her youth. Her excursion from a lower-class manufacturing plant young lady to the proprietor of the staple, and a bereft grandma was not a simple. Clearly, she had shaped herself to meet the two closures. The creator shockingly found out about her normal hankering as she states:

We discovered that the things we considered unimportant meant a lot to her: everyday news items, crime, accidents, being on good terms with one's neighbors, and trying not to "trouble" people. **(Ernaux 1992:63)**

The author, Annie Ernaux suffers from the memories of her dead mother as she poignantly discusses about her death:

She died eight days before Simone de Beauvoir. She preferred giving to everybody, rather than taking from them. **(Ernaux 1992:90)**

The affection disdain connection among Annie and her mother continued all through their life. She was unable to deny her mom's liberality and generosity. Her mom was insubordinate by changing her societal position through monetary circumstances. She was not feministic yet a warrior one who attempted to accomplish her objectives. She was the real projection of a woman portrayed by Simone de Beauvoir.

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08

PATANJALI'S ASHTANGA YOGA AND PHYSICAL EDUCATION

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ABSTRACT :-

The present research paper has been undertaken to focus and explore the relationship between Patanjali's Ashtanga Yoga and Physical Education. Also it would study in detail Patanjali's Ashtanga Yoga as Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana, Samadhi. However, the present investigation aims to highlight and examine the effects of Asana, specially Bhujanga Asana exercise on the flexibility of players.

Asana, is one of the crucial aspects of Pantanjalie's Ashtanga Yoga. As concerned to Asana, Bhujanga Asana is considered to improve the flexibility of player. On this consideration, the present research paper would examine the effect of Bhujanga Asana exercise on flexibility of players. Therefore, it is this study consists, Asana training to experimental group and control group by using experimental method. So this research paper is to focus and to know the existing flexibility and improved flexibility which would be measured by, Liner measurement flexibility test.

Also, Dhyana (Meditation) is one of the crucial Ashtanga Yoga. Meditation occurs through the practices of Pranayama. It would help in the exercise of Bhujanga Asana, so it would also study that its relation to Asana and fitness of player.

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Smart multifunctional coatings for antibacterial and self-cleaning applications

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HIGHLIGHTS

- The rapid synthesis of Ag-doped silica coatings and the quick assessment of their antibacterial activity.
- A Self-cleaning ability of coatings was checked by spreading dust on coatings and applying water drops to clean them.
- The robustness of the coatings was evaluated by sand impact test and water jet test.
- Antibacterial activity of the modified coatings was higher against the Gram-negative bacteria than Gram-positive bacteria.

GRAPHICAL ABSTRACT

ARTICLE INFO

Keywords:
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Dip coatings
Antibacterial

ABSTRACT

The contamination of healthcare and industrial surfaces by microbes, particularly antibiotic-resistant strains, has stimulated more excellent studies into creating effective antibacterial coatings. This work presents the rapid synthesis of metal nitrate (Ag) doped methyltrimethoxysilane (MTMS) coatings and the quick assessment of their antibacterial activity. The coatings were challenged with Gram-positive and Gram-negative bacterial cultures. The surface roughness of the modified coatings increases from 23.15 nm to 51.17 nm, and the corresponding water contact angle increases from 97° to 154°. Electron micrographs of the Ag/SiO_2 coatings revealed a highly porous network of silica particles on the glass surface. The Ag/SiO_2 coatings showed moderate antimicrobial activities against Gram-positive bacteria (*Staphylococcus aureus*) whereas strong antibacterial properties against Gram-negative bacteria (Escherichia coli).

1. Introduction

Due to their superior qualities and numerous applications, multifunctional flexible coatings have gained significant attention in the last ten years. Numerous industrial applications are possible with them, including those for personal electronics and medical equipment [1–4]. Because of the need for transparent, sterile, rigid, self-cleaning, protective surfaces, these responsive coating materials based on organic-inorganic blends are heavily focused on antibacterial applications. Antibacterial surfaces also have prime importance in various

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industrial products like textiles and fabrics, water treatment plants, facial masks, personal protective equipment, air conditioners, food processing, and packaging because they can kill or stop the growth of bacteria [5–7]. Pathogenic bacteria cause infectious diseases, which are a more significant threat to human life and result in huge losses. The second leading cause of human death is bacterial infections, accounting for approximately 17 million deaths per annum and 64% of all those needing to be hospitalized worldwide. Also, extensive use of antibiotics against bacterial infections gradually reduces the efficiency of these antibiotics as bacteria develop resistance to antibiotics [8–10]. So, it is legitimate to develop characters with extensive antibacterial properties and the potential to evolve into powerful tools for infection management.

The primary classification of antibacterial surfaces contains (a) bacteria-repulsive, anti-biofouling surfaces, which are resistant to primary bacterial adhesion, and (b) antibacterial surfaces, usually boosted with an antibacterial agent to kill bacteria.

The properties considered for synthesizing bacterial anti-adhesive surfaces are free energy, surface charge, zeta potential, and wettability [11–13]. However, numerous investigations into surface wettability have shown that both superhydrophobicity and superhydrophilicity prevent bacterial adherence [13–15].

The synthesis techniques of antibacterial surfaces include the incorporation of an antibacterial agent. Various researchers are investigating various inorganic antibacterial agents. Silver (Ag) is the most widely investigated of many antibacterial agents [16–19]. Other antibacterial agents investigated are gold (AU) [10,20,21], Copper(Cu) [1, 22], and some metal oxides, viz zinc oxide (ZnO) [23,24], copper oxide (CuO) [25,26] and titanium dioxide (TiO_2) [27,28].

Antibacterial coatings can be created using a range of physical and chemical techniques, such as physical vapor deposition (PVD), Chemical vapor deposition (CVD), electrochemical deposition, and sol-gel deposition. Each technique has its own unique advantages and disadvantages and can be used in different applications [29–31]. However, the sol-gel method has many advantages over other coating methods, such as excellent chemical homogeneity, low-temperature synthesis, and the ability to control particle size and shape. It is also a potent tool for producing glasses of varied compositions [32]. Sol-gel technique has gained much popularity because of its outstanding control over the texture and surface properties of the materials [33], reproducibility, and high surface-to-volume ratios of obtained products [34]. Materials synthesized by the sol-gel process provide suitable matrices for a wide range of organic and inorganic chemical compounds. Doped sol-gel materials' capacity to maintain the dopants' chemical and physical characteristics is one of their fundamental characteristics. This characteristic designates such substances as nearly exclusive carriers of various biologically significant compounds that can be applied in multiple biomedical applications [35].

Many groups interested in preparing silver-doped silica coatings reported different processing times, ranging between several hours [32, 36–39], and different gelation times ranging between several days [40, 41]. We intended to reduce processing and gelation time by heating and stirring during the hydrolysis of the precursor. As suggested in our previous article [42], a slight change in the homogenization and hydrolysis process gave us encouraging results in effectively reducing the processing time and gelation time. In a study, the temperature was maintained by continuous stirring during the hydrolysis of the precursor. The increase in temperature of the precursor effectively reduces the processing time and the gelation time because aggregation takes place faster at a higher temperature. Increasing temperature increases the particle's kinetic energy, i.e., the particle's speed, and thus increases the probability of collision and aggregation. This generally increases the number of secondary particles with time, thus generally reducing the gelling time as the reaction temperature increases [43].

2. Materials and synthesis

2.1. Materials

Silver-doped SiO_2 coatings were prepared using the dip coating method by the sol-gel process. The chemicals used were Methyltrimethoxysilane (MTMS), trimethylchlorosilane (TMCS) (Sigma-Aldrich Chemical, Germany), Methanol (MeOH), and hexane (S. D. Fine chemicals, India), Nitric acid (HNO_3) and silver nitrate ($AgNO_3$) (Loba chemicals, India).

2.2. Synthesis

The initial solution was prepared from MTMS, MeOH, and distilled water with a molar ratio of 1:17.63:7.92. In the first step, MTMS, MeOH, and distilled water were mixed and stirred at 45 °C for 10 min 0.5 N HNO_3, a hydrolysis catalyst, was added to a solution to keep the pH value of the solution at 3.5 approximately. After stirring for 20 min, an $AgNO_3$ solution was added, and the sole was further stirred for 30 min. The MTMS: $AgNO_3$ molar ratio was held constant at 1:0.24. As nitrates are decomposed easily during heating, $AgNO_3$ is one of the best precursors for silver. During this whole process, the temperature of the solution was kept constant at 45°.

After the sol was prepared, an optically transparent and ultrasonically cleaned microscopic substrate was dipped vertically into a sol. The substrate was kept in a sol for a sufficient time and withdrawn at a constant rate of 4 mm per second to get the desired uniform thickness of the coatings. To obtain a strong chemical bond between the substrate and deposited coatings, the coatings were dried at room temperature for 1 h. All the films were heat treated at 150 °C in the air for 2 h with a ramping rate of 1 °C/min to obtain transparent and uniform coatings. After heat treatment, yellowish transparent coatings were obtained. Some of these coatings were further modified using TMCS as a silylating agent. These films were dipped in a 0.8% TMCS in hexane for 24 h. After removing the TMCS solution, the coatings were dried at room temperature for 1 h and thermally cured at 150 °C for another hour.

3. Characterization

A UV–Vis spectrometer (Systronics 119, USA) was used to obtain the UV–Vis spectra of dried sol in the range of 300–800 nm. To determine IR spectra, pellets of the powder scratched from coatings were prepared by mixing the dried sol with a KBr-diluted medium. Pellets were dried for 24 h at 150° Celsius. A Fourier transform infrared spectrometer (FTIR) (PerkinElmer Model no. 783, USA) is used to record IR spectra in the range of 4000 to 400 cm^{-1}, having a resolution of 1 cm^{-1}. Surface morphology and homogeneity of unmodified and TMCS-modified coatings were investigated using Scanning Electron Microscopy (SEM) (Model: JEOL-JSM-6360). The coating surfaces' topography is responsible for a surface's wettability. The wettability of the unmodified and TMCS-modified coatings was studied using Atomic Force Microscopy (AFM Nanoscope E′ of 'Digital Instruments, USA). The water drop contact angle was measured with a standard goniometer (Ramehart Instrument Co., USA) equipped with a CCD camera. All contact angles were determined by maintaining a 10 L water droplet on a coating at room temperature.

A self-cleaning test is employed to check the self-cleaning ability of coatings. The mechanical hardness of coatings was checked using jet spray test and sand impact test. The film attachment method was used to perform an antibacterial test. The microorganisms used were Escherichia coli (gram-negative), and *Staphylococcus aureus*, (gram-positive). Escherichia coli was chosen because these types of bacteria are accountable for more than 80% of all infections.

4. Result and discussion

4.1. Optical transmission studies

Fig. 1 shows the optical transmission spectra of the unmodified and TMCS-modified Ag/SiO_2 films. The optical transmission of the coatings occurs in the visible wavelength region, and both are translucent because they do absorb a small amount of visible light. Both unmodified and TMCS-modified coatings showed an optical transmission of 79%.

4.2. Fourier transform infrared spectroscopy analysis

The FT-IR transmission spectra for unmodified and modified silver-doped SiO_2 coatings named Ag/SiO_2 are shown in Fig. 2. The characteristic peaks in the spectrum acknowledge the formation of bands. There are eight absorption peaks at 455 cm^{-1}, 795 cm^{-1}, and 1083 cm^{-1} assigned to three vibrational modes of Si–*O*–Si bonds. The peak at 455 cm^{-1}, the lowest frequency mode, corresponds to the symmetric Si–*O*–Si stretching. A weak band near 795 cm^{-1} is due to the symmetric stretching of the Si–*O*–Si bond. The highest frequency mode, 1083 cm^{-1}, relates to and fro the motion of the oxygen atom parallel to the Si–Si axis [44–46]. The peak at 964 cm^{-1} shows the existence of a characteristic Si–OH bond, while the bond peak at 1385 cm-1 is due to residual organics. The peak at 1634 cm^{-1} is due to the bending of absorbed water molecules on the silanol bond with hydrogen bonds. The large band around 3463 cm^{-1} is the stretching of the OH groups [47,48]. Additionally, the Ag/SiO_2 sample shows new absorption peaks at 836 cm^{-1} and 1755 cm^{-1}, which correspond to Si–*O*–Ag bond vibrations. The two peaks at 3009 cm^{-1}, and 762 cm^{-1} are designated to C–H stretching vibrations. The intensity of these C–H bands increased significantly after TMCS modification resulting in an increase in water contact angle. Based on the FTIR bond values, silica matrix formation is conformed through its respective vibration mode among silanols and siloxanes [49].

4.3. Wettability analysis

The water droplet contact angle with the solid surface can be used to estimate the surface's hydrophobicity. Fig. 3a and b shows images of the water droplet on unmodified coatings and TMCS-modified Ag/SiO2 coatings, respectively. For these coatings, the contact angle of a water drop increased from 95 ± 2° to 154 ± 2°. A lower water contact angle in unmodified Ag/SiO_2 coatings was observed due to the presence of hydroxyl groups on the surface of the coatings. These hydroxyl groups help in the adsorption of water molecules on the coating surface. A greater contact angle on TMCS-modified coatings shows that the silica coatings have become more hydrophobic, perhaps because the non-polar –CH_3 groups of the TMCS replace the polar –OH groups on the coating surface.

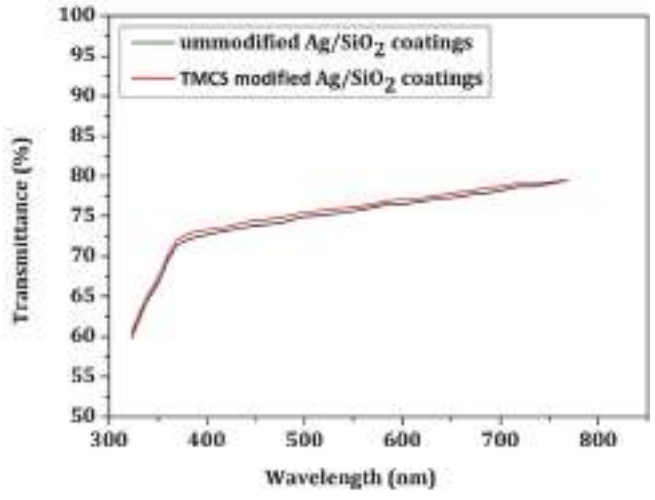

Fig. 1. Optical transmission spectra of unmodified and TMCS-modified Ag/SiO_2 coatings.

4.4. Atomic force microscope (AFM)

In addition to the chemical composition, the wettability of coating surfaces also depends on the topography of the coatings. Fig. 4a and b shows the standard three-dimensional AFM image and roughness profile of the unmodified coatings. In contrast, Fig. 4c and d shows the AFM image and roughness profile of TMCS-modified films on the glass substrates, respectively. The images were recorded at 2 × 2 μm^2 planar in contact mode. The root means square (RMS) roughness value of the unmodified and TMCS-modified Ag/SiO_2 was obtained to be 23.15 nm and 51.17 nm, respectively. Compared to unmodified films, TMCS-modified films have a higher surface roughness value, resulting in a greater contact angle.

The unmodified and TMCS-modified coatings surface shows a hills and valleys structure. Unmodified coatings were a smaller number of short hills, whereas TMCS-modified coatings have a more significant number of growing hills projecting upward. This increase in the number and height of the hills in TMCS-modified coatings contributed to increasing contact angle. The low surface contact area due to hills and valleys on coatings prevents water from penetrating valleys. Due to this, water cannot wet the surface leading to a superhydrophobic surface.

4.5. Surface morphology studies

The surface microstructure of the unmodified and TMCS-modified coatings was examined through SEM. The critical parameter for making hydrophobic surfaces is surface roughness. Two-dimensional FESEM images of unmodified Ag/SiO_2 (Fig. 5a–b) and TMCS-modified Ag/SiO2 (Fig. 5c–d) coatings show highly porous 3D structure with a micro-nano roughness which is responsible for the wettability. Unmodified Ag/SiO2 shows varying grain sizes ranging from 1 to 7 μm and a nonuniform distribution of these grains. TMCS-modified Ag/SiO2 shows the desired surface morphology of coatings with a highly porous surface. The grain size ranges from 1 μm to 2 μm. As clearly seen, the unmodified and modified coatings have a particle size distributed over a range of 250 nm–320 nm. This micrograph shows the high degree of continuity in the silica particle's porous network. This porosity leads to hydrophobicity.

4.6. Self-cleaning ability of coatings

The Lotus leaves demonstrate self-cleaning properties. As the water falls on a lotus leaf, it collects all the debris in its path and rolls off quickly, leaving a clean leaf behind. The self-cleaning ability of superhydrophobic coatings was demonstrated using this characteristic of lotus leaves. Upon contact with the rough surface of the superhydrophobic surface, water drops adopt a round shape and flow off quickly. Additionally, dust particles accumulate at the tips of the rough structure, which facilitates the accumulation of dust particles by the spherical water drops [6,7]. Compared to rough superhydrophobic surfaces, dust adheres to water drops much more strongly. Rolling water drops can readily self-clean dust particles between submicron and millimeter sizes on the lotus-leaf-like superhydrophobic surface.

The self-cleaning ability of unmodified and TMCS-modified coatings was verified. Normal dirt is used as dust as coatings are most likely to be exposed to this dirt. Dust was arbitrarily scattered over both coatings. A small drop was formed using a syringe and slowly placed on a substrate with dust inclined to roll off the drop. A water drop on TMCS-modified coating effectively collects dust during roll-off as shown in Fig. 6a. With the minimum inclination required to roll the drop, water droplets on TMCS-modified coatings collect dust and break after leaving the coating. An area of 2 × 2 cm2 of TMCS-modified coating was cleaned with only 5

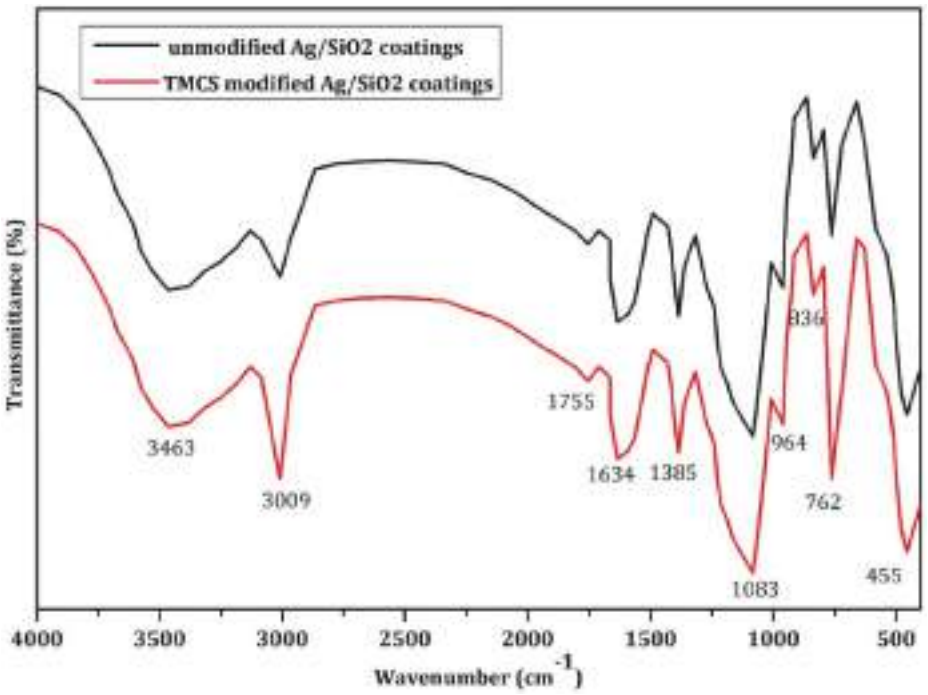

Fig. 2. FTIR spectra of unmodified and TMCS-modified Ag/SiO_2 coatings.

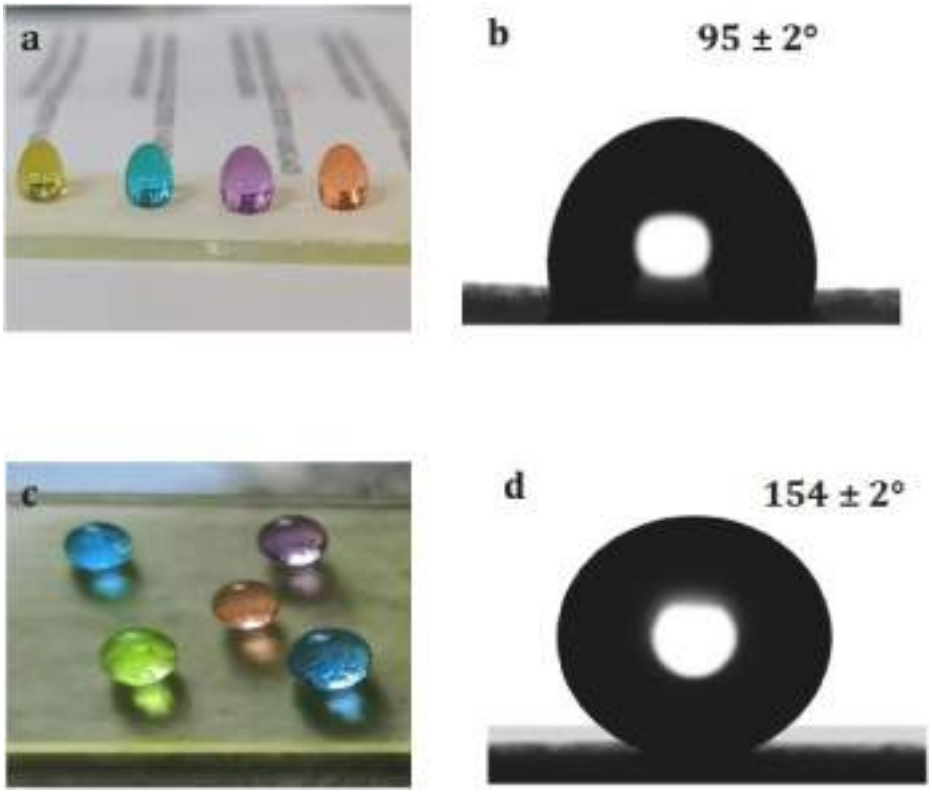

Fig. 3. Water contact angle measurement of (a, b) unmodified and (c, d) TMCS-modified Ag/Sio_2 coatings.

water drops. This self-cleaning ability of TMCS-modified coating was tested more than 20 times, and the results specify the outstanding self-cleaning property. An unmodified coating also shows self-cleaning ability, but the equal area with the approximately same amount of dust required a greater number of water drops to clean the coating as compared to TMCS-modified coating.

4.7. Mechanical robustness of coatings

The morphology of surfaces can be altered by dynamic impacts, which can lead to a decrease in superhydrophobicity. The coating was evaluated under two different dynamic impact scenarios (sand impact and water jet impact).

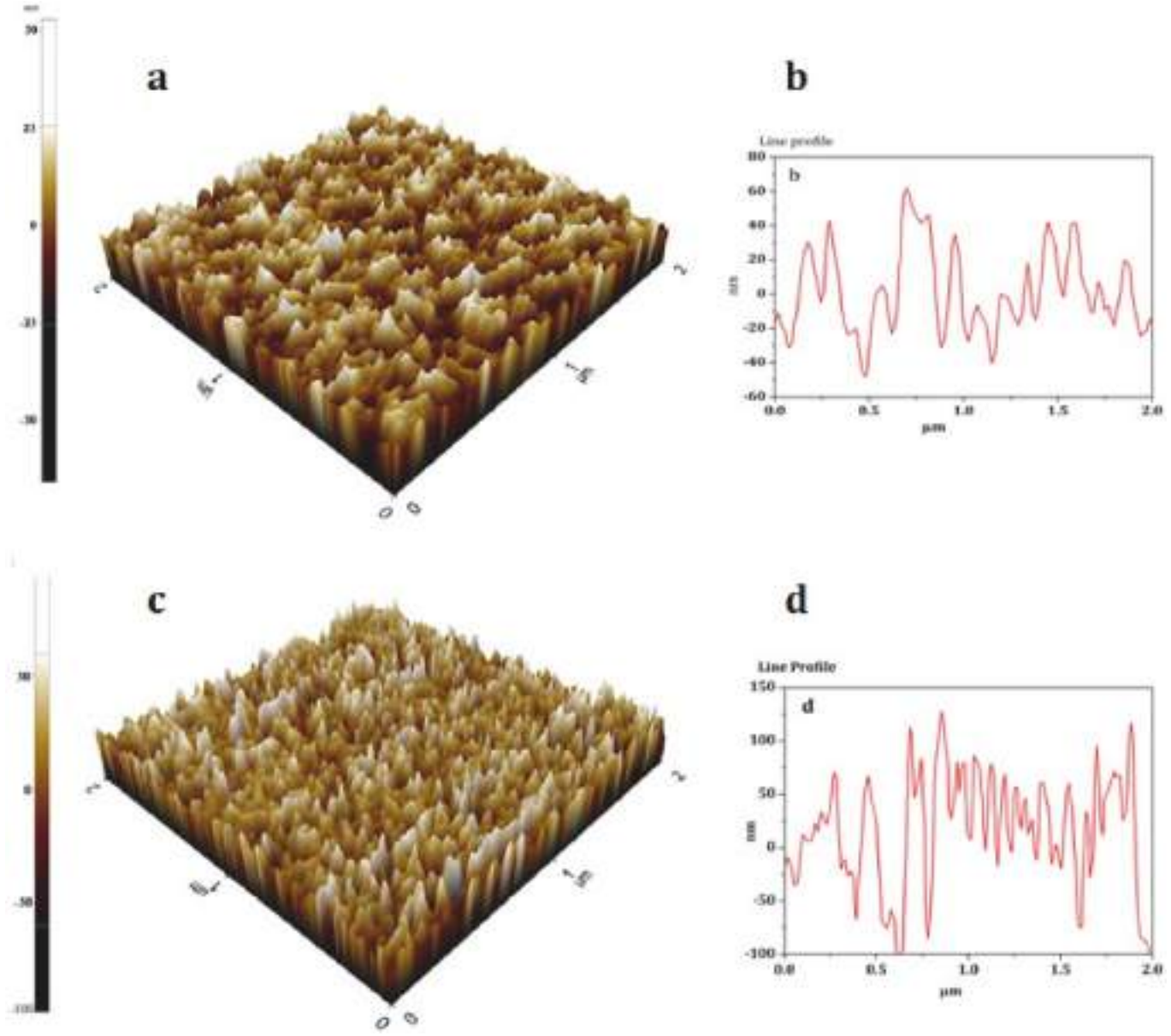

Fig. 4. 3D AFM image and roughness profile of unmodified (a, b) and TMCS modified (c, d) Ag/Sio_2 coatings respectively.

4.7.1. Water jet impact test

Superhydrophobic coatings must be mechanically stable in order to be useful in practical applications. High-speed water droplets in the rainy season can degrade the micro-nano surface morphology of the coating, resulting in a loss of superhydrophobicity characteristics. In order to assess the structural strength of superhydrophobic coatings, water jet tests have been conducted. A water jet generated from a 20 ml syringe was sprayed over the superhydrophobic coatings at 3–4 cm above the surface. As the maximum speed of the water drop in rainfall is 8 m/s, the jet's velocity was maintained at 8–9 m/s Approximately [50]. At this impact velocity, the dynamic pressure exerted by the water jet on the surface of the coating was 32 kPa–40.5 kPa.

Upon impact, with unmodified and TMCS-modified coatings a water jet repelled quickly away without spreading. Fig. 6b shows the photograph of the impacted water jet on TMCS-modified. These tests were conducted with measurements of WCA every 10 s until the value exceeds the superhydrophobic threshold. A TMCS-modified coating remained superhydrophobic up to 200 s.

4.7.2. Sand impact test

In outdoor applications, superhydrophobic coatings are subjected to harsh conditions including collisions with particles. By destroying the coating's surface or altering its surface chemistry, these processes will negatively impact the coating's chemical or structural properties. Therefore, sand impact tests were performed on the coatings after being prepared. Containers with sand were positioned 10 cm above the specimen which was inclined at 45°.

For each impact cycle, 10 g of 0.3–0.5 mm-sized sand particles were employed. For this, a laboratory setup for testing dynamic impact resistance was used as discussed in the previous chapter. The outcomes for both unmodified and TMCS-modified samples are shown in Fig. 6c. With each passing cycle of the sand impact test, both coatings lose their hydrophobicity. After the 5th (50 g) cycle, the unmodified sample lost its hydrophobicity, and WCA drops to 85° ± 2°. TMCS-modified sample shows the best performance even after 12 cycles (150 g) and holds its water-repellence properties. After the 13th (130 g) cycle TMCS-modified coating also loses its superhydrophobicity and WCA drops to 148° ± 2°. After this, both the coatings were challenged by the sand impact from

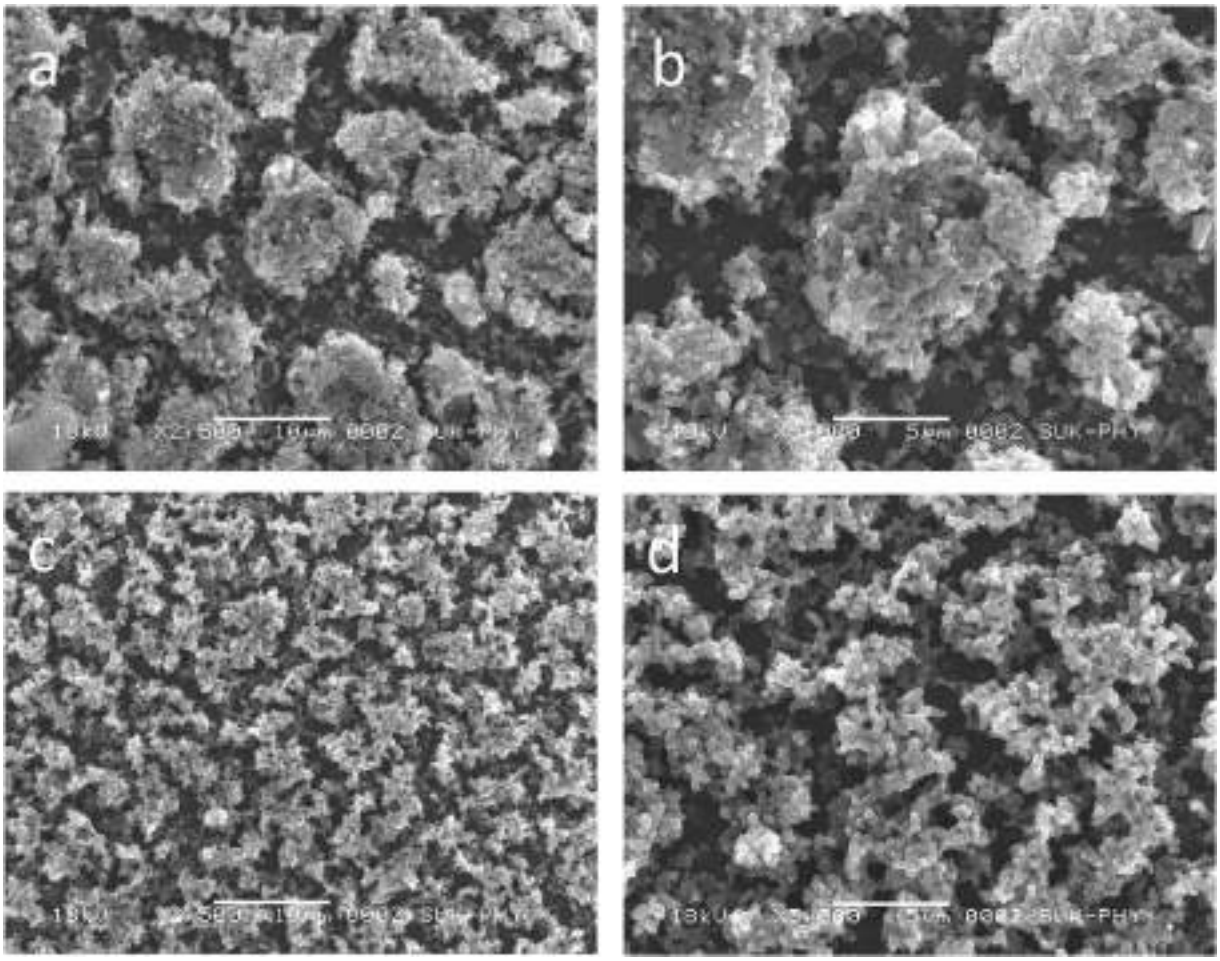

Fig. 5. Scanning electron microscope images of different magnifications for unmodified (a, b) and TMCS-modified Ag/Sio$_2$ coatings.

different heights (20/30/40/50). A 10 g. Of sand was used for each height. With the increase in height, the impact velocity of sand particle increase, and the tolerance of hydrophobicity decreases.

For each impact cycle, 10 g of 0.3–0.5 mm-sized sand particles were employed. For this, a laboratory setup for testing dynamic impact resistance was used as discussed in the previous chapter. The outcomes for both unmodified and TMCS-modified samples are shown in Fig. 1a. With each passing cycle of the sand impact test, both coatings lose their hydrophobicity. After the 5th (50 g) cycle, the unmodified sample lost its hydrophobicity, and WCA drops to 85° ± 2°. TMCS-modified sample shows the best performance even after 12 cycles (150 g) and holds its water-repellence properties. After 13th (130 g) cycle TMCS-modified coating also loses its superhydrophobicity and WCA drops to 148° ± 2°. After this, both the coatings were challenged by the sand impact from different heights (20/30/40/50). A 10 g. Of sand was used for each height. With the increase in height, the impact velocity of sand particle increase, and the tolerance of hydrophobicity decreases.

A simple experiment was carried out to prove the presence of an air layer on the superhydrophobic coating. For this, a superhydrophobic coating and pristine glass substrate were immersed in water (Fig. 6d and e). Surfaces of pristine substrates and superhydrophobic samples exhibit a distinct phenomenon. Capillary force makes water climb some distance along untreated substrates, but superhydrophobic surfaces never allow water to contact the sample.

4.8. Antibacterial studies

Ag/SiO_2 coatings' antibacterial efficacy was evaluated against Gram-positive and Gram-negative microorganisms using the film attachment method. *Staphylococcus aureus*, and Echerichia coli were the microbes employed. The immaculate glass slide served as a control (reference). The outcomes of the antimicrobial activity of pristine, unmodified, and TMCS-modified coatings are depicted in Fig. 7. The control samples revealed no zone of inhibition, and it was possible to see bacterial growth on or near the glass. TMCS-modified coating displayed strong antibacterial activities against Gram-negative bacteria (Escherichia coli) as shown in Fig. 7a and moderate antimicrobial properties against Gram-positive bacteria (*Staphylococcus aureus*) as shown in Fig. 7b. The antibacterial activity of TMCS-modified coatings increases as wettability increases. The TMCS-modified coatings showed the highest inhibition zones. This highest inhibition is due to the high surface area of the TMCS-modified coatings [51]. The microparticles can easily attach to the cell membrane of bacteria, tunnel through it, and pile up there. Silver ions are released into the bacteria's nuclei by Ag/SiO2 through slow oxidative dissolution, resulting in their death [52,53]. The bigger zones of inhibition were observed for the TMCS-modified Ag/SiO_2 coatings for both bacteria. The antibacterial activity of the TMCS-modified Ag/SiO_2 coatings was higher against the Gram-negative bacteria than Gram-positive bacteria. It could be because Gram-positive bacteria contain a higher level of peptidoglycan, which resists silver particles [54]. Additionally, this difference in activity could be caused by differences in the structure of bacterial cell walls. In gram-positive bacteria, the outer membrane possesses a more complex structure and restricts the entry of many substrates and compounds, including micro-nano particles [55].

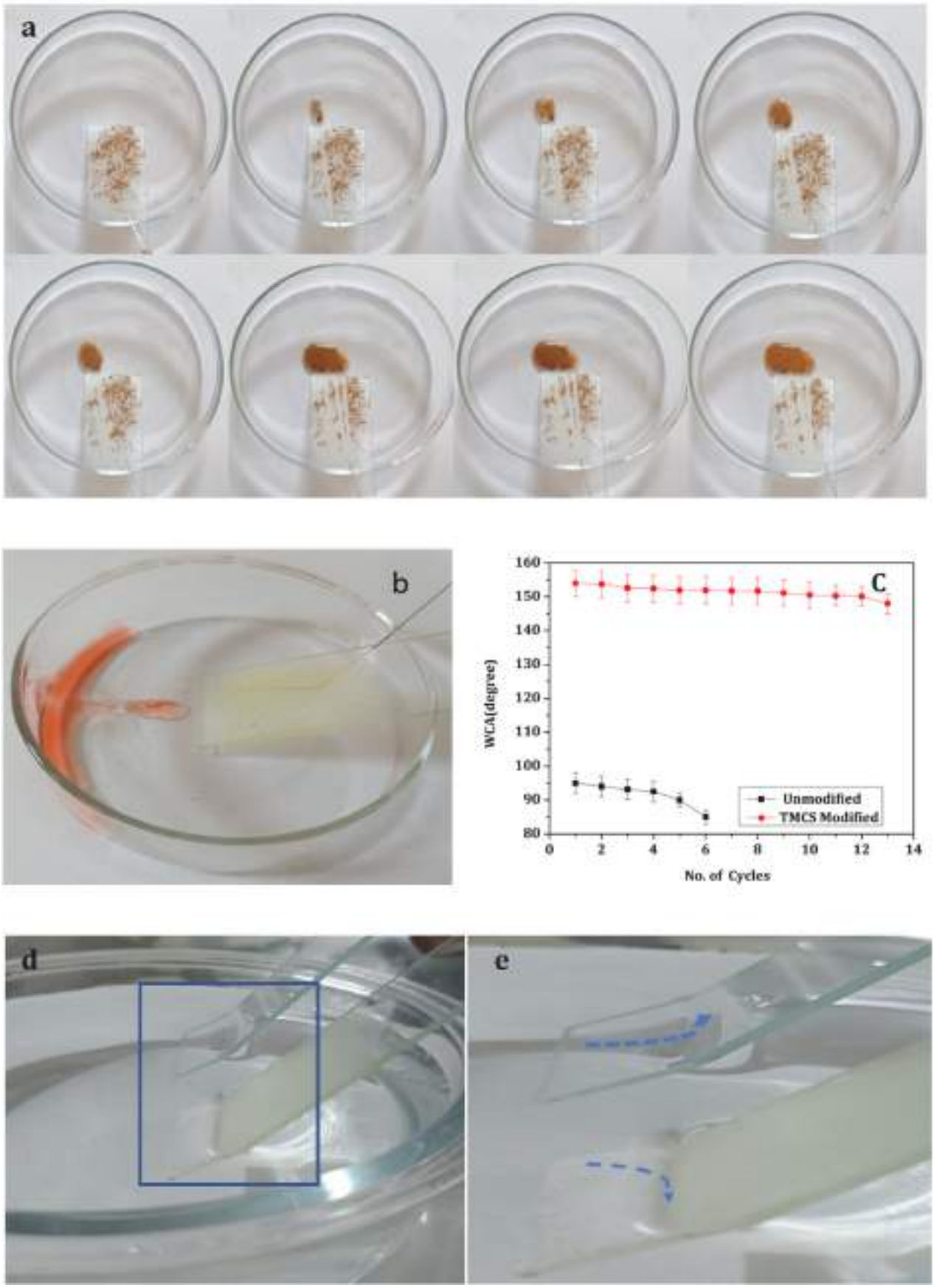

Fig. 6. Self-cleaning ability of TMCS-modified coatings (a), water spray jet test (b), sand impact test (c) and experiment to prove stable air layer on coatings (d, e).

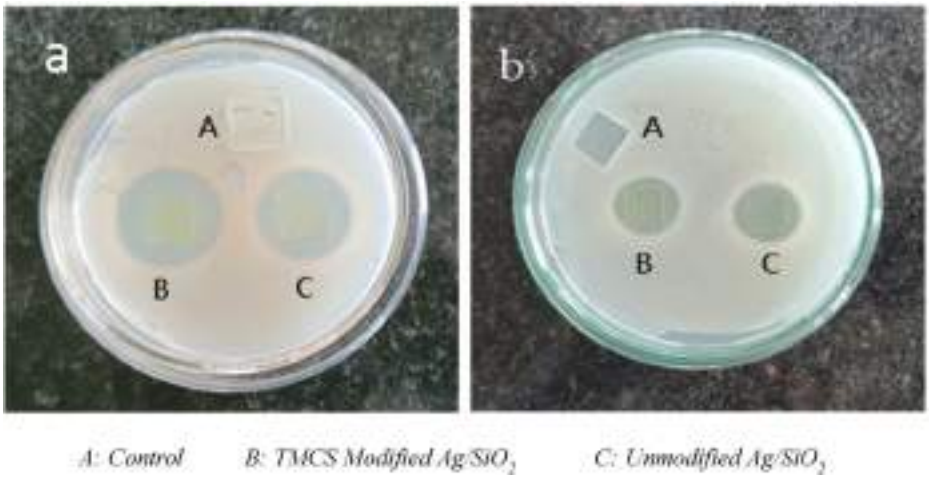

Fig. 7. Antibacterial activity of unmodified and TMCS-modified coatings for a) Escherichia coli, b) *Staphylococcus aureus*

5. Conclusions

Superhydrophobic coatings with antibacterial properties were fabricated rapidly by in situ sol-gel method. The micro-nano roughening effect of the coating surface favors the construction of superhydrophobic surfaces. At the same time, incorporating the silver particle into the silica matrix provides an antibacterial property to the coatings. This method of multi-functionalizing simple glass with one material is helpful in various industries. This method is expected to become a formidable platform for manufacturing multifunctional materials. Though these antibacterial coatings provide various advantages in terms of minimizing bacterial transmission and avoiding infections, it is crucial to carefully examine their use for several other bacteria. Furthermore, the practical applications may need a large surface area which is beat challenging to produce by using the sol-gel dip coating method. This may limit the potential use of these antibacterial coatings.

CRediT authorship contribution statement

Sandip S. Patil: Conceptualization, Investigation, Validation, Writing – original draft. **Rakesh R. Shedam:** Formal analysis. **Rajive S. Vhatkar:** Supervision, Writing – review & editing. **Mahadev R. Shedam:** Supervision, Writing – review & editing.

Declaration of competing interest

We certify that there is no actual or potential conflict of interest in relation to this article.

Data availability

Data will be made available on request.

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Synthesis Of Silica-Based Superhydrophobic Coatings For Self-Cleaning Application

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Abstract

There is a high demand for superhydrophobic coatings that are optically transparent, mechanically durable, and self-cleaning for everyday use. Researchers have attempted to create such coatings on glass using silica- polymethylmethacrylate composite through sol-gel processing. The coatings show a water contact angle of 154^0 and a sliding angle of 8^0. The coatings also show a good self-cleaning behavior collecting dirt from the coating surface. The coatings' mechanical stability was examined using a water jet. The addition of a small amount of PMMA polymer to the silica improves mechanical stability.

Keywords: Silica coatings, Superhydrophobic, Self-Cleaning

1. Introduction:

It is impossible to achieve perfect mimicry in both the arts and sciences. Although scientists have developed superhydrophobic surfaces with excellent self-cleaning properties by mimicking the micro/nanostructure and chemical composition of lotus leaves,[1] achieving the same degree of non-wettability, durability, self-healing, and self-cleaning properties as lotus leaves on artificial surfaces is a difficult task. In order to use superhydrophobic coatings in daily life applications, they must possess both high optical transparency and mechanical durability, which is challenging because surface roughness is a critical parameter for developing superhydrophobic surfaces. On highly rough superhydrophobic surfaces, the contact area between the solid and liquid is minimal, and water droplets roll over the surface effortlessly, collecting dust particles without leaving any traces behind. However, highly rough surfaces are also brittle and easily damaged by little force, making it challenging to use them in everyday applications. To make superhydrophobic surfaces highly transparent, the surface roughness must be smaller than the wavelength of light, and surfaces with roughness values less than 400 nm can be highly transparent. [2.3] However, the challenge lies in balancing the

durability and transparency of superhydrophobic coatings. Coatings that prioritize transparency over durability can only be used in short durations and damage-free areas.

Currently, the focus of superhydrophobic surface research is on practical applications. Such surfaces can be used in outdoor settings, such as on-road mirrors, car windshields, building windows, and various metals for anti-corrosion purposes. [4-6] Polymers that have good film-forming properties, natural hydrophobicity, high optical transparency, toughness, and flexibility are the ideal materials for designing and developing durable and transparent superhydrophobic surfaces. Adding polymers, even in small amounts, to the inorganic phase can enhance the overall properties of the composite coating, particularly its mechanical durability and optical transparency. [7-9] Researchers have developed transparent superhydrophobic films using various techniques, such as modifying silica nanoparticles with hydrophobic polydimethylsiloxane [10], synthesizing raspberry-like SiO2/polystyrene particles [11], and preparing superhydrophobic porous polymer coatings. [12] However, these methods have limitations such as large contact angle hysteresis, weak mechanical stability, and white color.[13] In the current study, the researchers found that adding a small amount of Poly(methylmethacrylate) (PMMA) polymer to sol-gel processed silica sol resulted in a superhydrophobic coating with better optical transparency and scratch resistance. However, increasing the amount of PMMA reduced the mechanical durability of the coating. The study proposed a simple and direct method for creating semi-transparent, durable, and self-cleaning superhydrophobic coatings.

2. Material and synthesis

2.1 Materials:

Tetraethyl orthosilicate (TEOS 98%), poly(methylmethacrylate) (PMMA), and *N*,*N*-dimethylformamide (DMF) were purchased from Sigma Aldrich, USA. Methanol (MeOH), and ammonia solution (NH_3OH), were obtained from Loba Chemicals, India. Methylene

2.2 Synthesis of Superhydrophobic Coatings

Initially, a mixture was prepared by adding 5 ml of double distilled water and 1 ml of 0.5 M ammonia solution to 20 ml of ethanol with continuous stirring. After stirring for 1 hour, 5 ml of TEOS was slowly added drop by drop to the mixture, and stirring was continued for an additional 2 hours. Meanwhile, a solution of 5mg/ml PMMA in DMF was made. Silica sols containing 2%, 4%, and 6% PMMA were prepared by adding the PMMA solution to previously prepared silica sol and stirring the mixture for another 4 hours. Glass substrates were then dip-coated with the sol using a dipping rate of 5 mm/s and withdrawal with same. The deposition time varied from 5 to 10 minutes. All the experiments were conducted at room temperature. The dip-coated substrates were air-dried at room temperature for 1 hour and then annealed at 150^0 C for 4 hours with a ramping rate of 2^0 C per minute.

3. Characterization

The surface microstructure of the coatings was examined through Scanning Electron Microscopy (Model: JEOL-JSM-6360). Fourier Transform Infrared Specgroscopy was used to analyze the chemical compositions of the coatings, while a UV-Vis spectrophotometer (Systronics 119, USA) was used to measure the optical transmission of the coatings. Optical photographs and videos were captured using a Canon Digital Camer (1500 D). The contact angle of water was measured at ten different positions on the samples using a contact angle

goniometer (Ramehart Instrument Co., USA), and the average value was taken as the final value. The self-cleaning ability of coatings was examined by applying water drops to the coating surface with dirt.

4. Result and discussion

4.1 FTIR Studies

The FTIR spectrum of the unmodified, 4 vol. % PMMA modified, and 6 vol. % PMMA modified silica coatings are shown in Fig. 1.

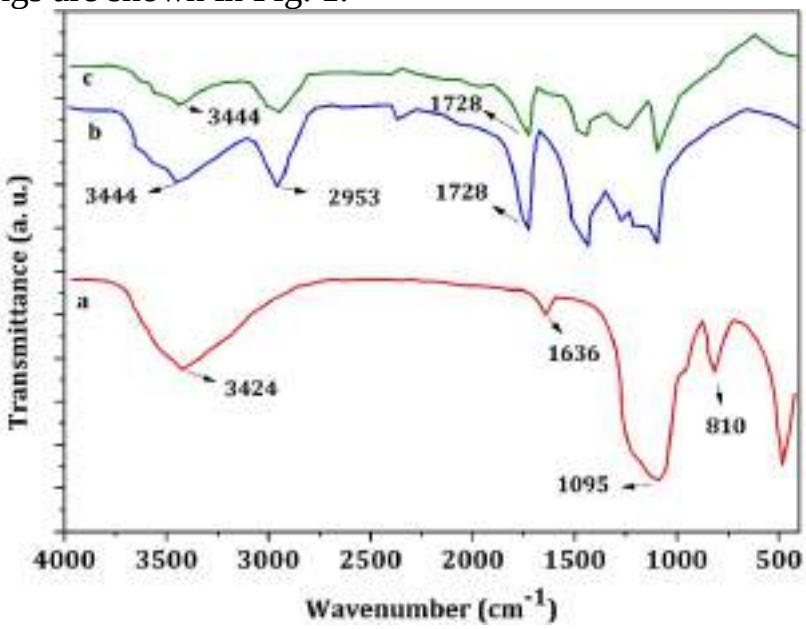

Fig. 1 FTIR spectra of unmodified silica (a), 4 vol. % PMMA (b), and 6 vol.% PMMA (c) modified silica coatings

The figure labeled as Fig. 1(a) illustrates the IR spectrum of unmodified silica, which displays a band at 3424 cm^{-1} indicating the presence of surface hydroxyl groups [14] and adsorbed water (the Si-H_2O flexion) at 1636 cm^{-1}. [15] The spectrum also shows a characteristic band of unmodified silica such as a Si-O stretching mode of Si-O-Si linkages at 1095 cm^{-1} and at 810 cm^{-1}. [16] The peak at 1728 cm^{-1} in Fig. 1b and c is attributed to the ester group in PMMA.[17] The peak at 2953 cm^{-1} is due to the symmetric stretching vibration of the C-H bond corresponding to a non-polar CH_3 group in PMMA [18] which is responsible for the increase in constant angle for PMMA-modified coatings. The presence of the silanol group (Si-OH) stretching is shown by the peak at 3444 cm^{-1}.[19] Both spectrum 1b and c show a peak at 1095 cm^{-1} is attributed to the Si-O stretching mode of Si-O-Si linkages.[20] This confirms that polymer chains had been successfully grafted on the surface of silica modified by PMMA.

4.2 Optical Transmittance

The relationship between hydrophobicity and transparency is affected by the roughness of the surface. When a surface is rough, it scatters light and reduces the amount of light transmitted, which makes it harder to achieve high transparency in the visible range. To achieve better transparency, the surface nanostructures should be controlled to be less than 400 nm.

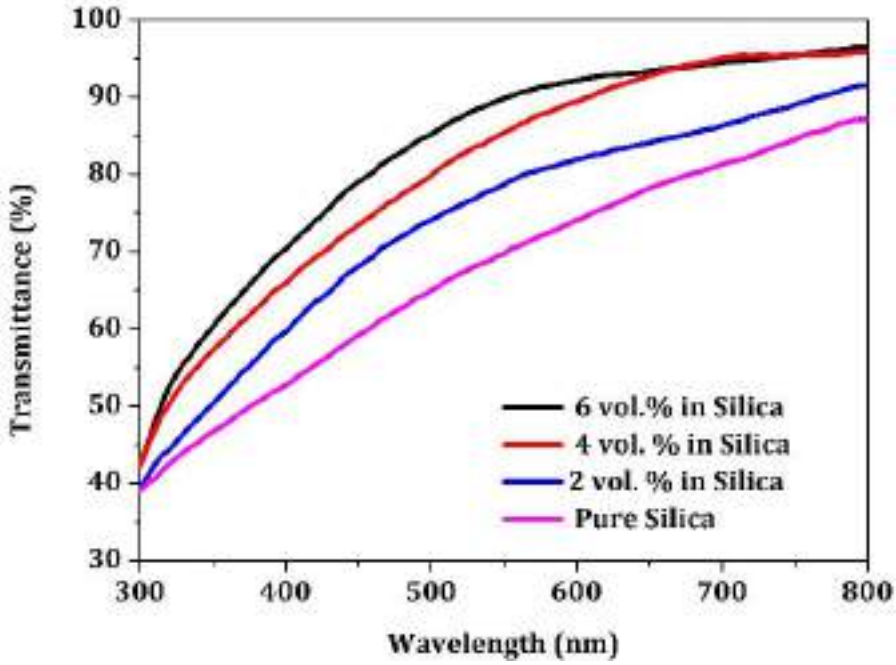

Fig. 4.2 Transmittance study of pure silica and PMMA-modified silica coatings.

The Transmittance of superhydrophobic coatings on glass was measured using a UV-Vis spectrometer (Systronic 119, USA). From the above spectrum, it is clear that the transmittance of the coating increases with increasing the vol. % of PMMA. A 6 vol. % PMMA-modified silica coatings show the highest transmittance. The surface roughness of these coatings was measured using a surface profilometer (Ambios XP-1 Model). At a specific location, the surface roughness was measured ten times, and for each sample, the average of the five measurements was calculated.

As shown in the table.1, the surface roughness of the film increases with an increase in the concentration of PMMA in base silica sol.

Table 1 surface roughness (R_q), transmittance, and contact angle values of unmodified silica, 2 vol. % PMMA modified silica, 4 vol. % PMMA modified silica, and 6 vol. % PMMA modified silica coatings

Sample	Roughness R_q (nm)	Transparency (%)	Contact Angle
Pure Silics	15.5	87	85
2 vol. % PMMA in Silica	27.8	91	126
4 vol. % PMMA in Silica	45.6	96	154
6 vol. % PMMA in Silica	37.3	96	135

4.3 Surface morphology studies

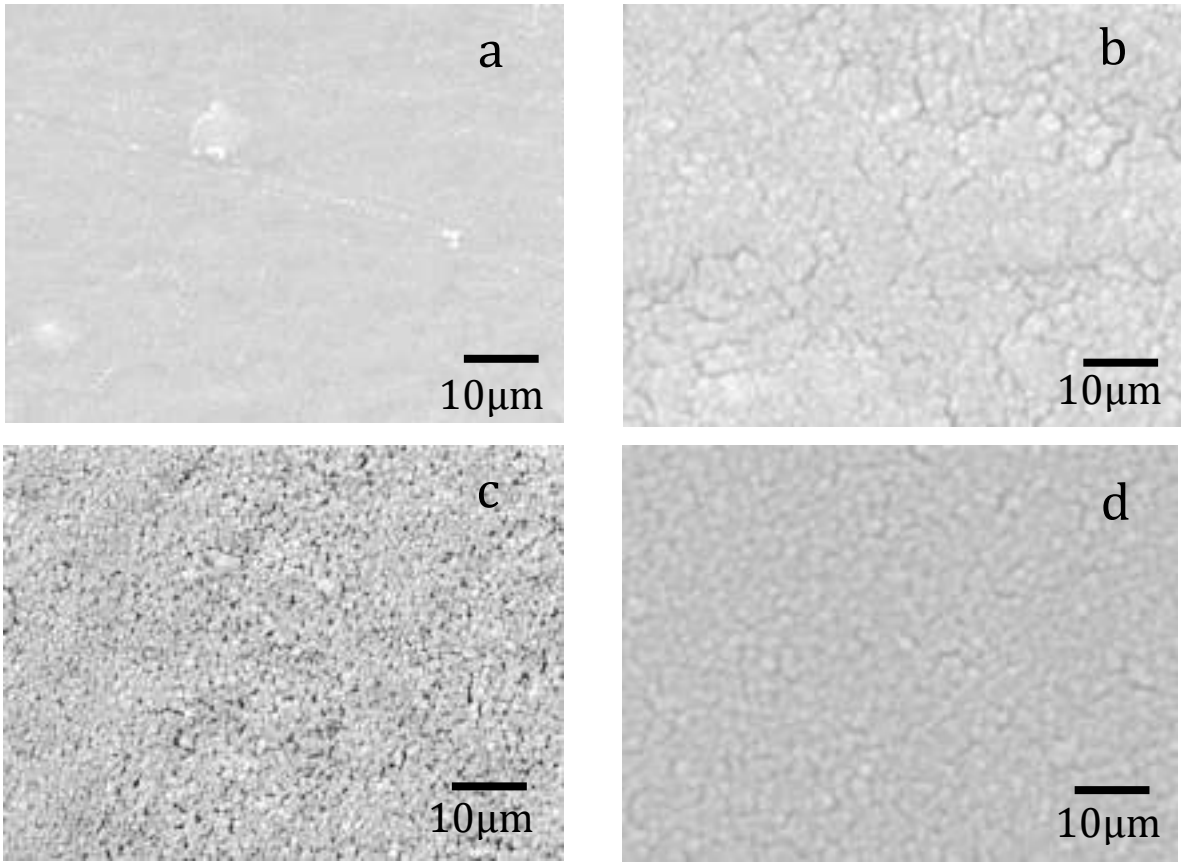

Fig. 4.3 SEM micrograph of Silica coatings without PMMA (a), 2% PMMA (b), 4% PMMA (c), and 6% PMMA (d)

The coatings that contained 4 vol % of PMMA in silica had the highest water contact angle after 10 minutes of deposition compared to other coatings compositions. SEM images in Fig. 4.3a showed that the coatings prepared without PMMA had a homogenous morphology, resulting in a low contact angle. Coatings with 2%, 4%, and 6% of PMMA have nonhomogeneous morphology, which is desirable for a higher contact angle. Coatings with PMMA showed a porous morphology with the highest porosity for a coating with 4% PMMA. The coatings with 4% PMMA showed a porous interconnected solid layer with micro-nano scale roughness present in between the structure (fig. 4.3c). The presence of such micro-nano scaled roughness could easily trap the air, and water could sit on the layer of air in the Cassie-Baxter state. Further, an increase in PMMA % decreases the porosity and surface roughness causing the decreases in water contact angle.

4.4 Water Contact Angle Measurement

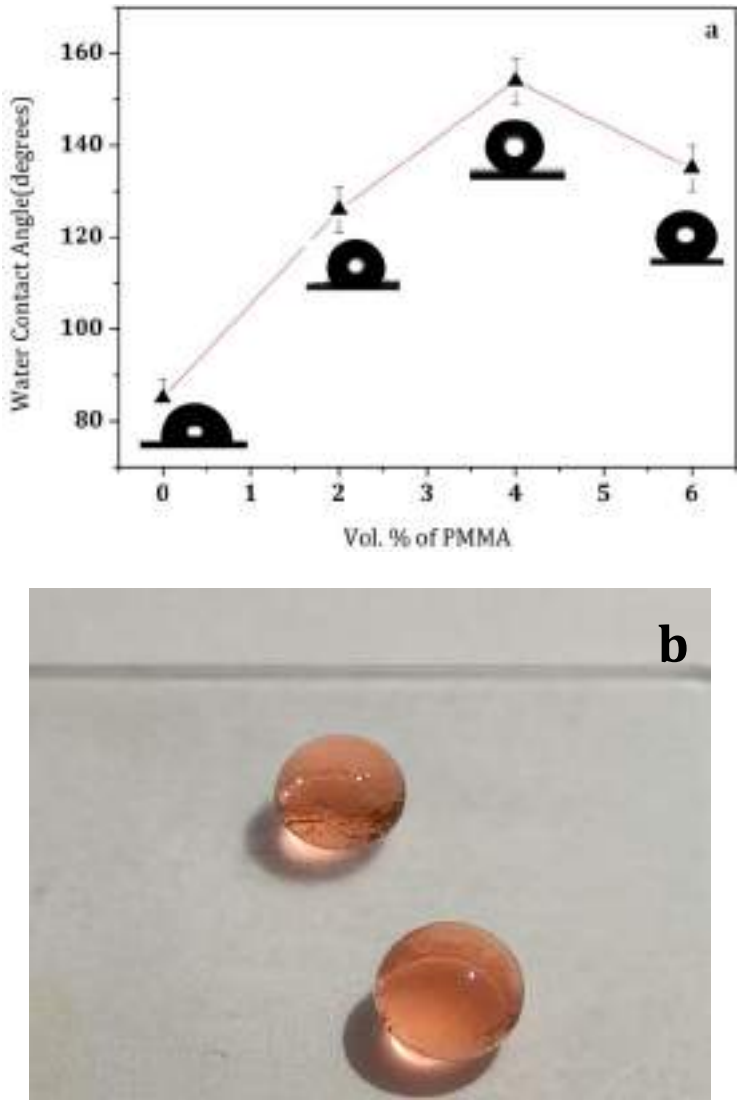

Fig 4.4 Water contact angle for different vol % of PMMA (a) and water droplet photograph of spherical water drop on 4% PMMA Silica film (b)

Fig**. 4.4a** shows the water contact angle measurement for various vol. % of PMMA-added silica coatings. As the vol. % of PMMA increases water contact angle increases and becomes superhydrophobic for % PMMA modified silica coatings. A contact angle of 154^0 was recorded for 4 % PMMA-modified silica coatings(fig. 4.4 a). increase in PMMA concentration in base sol will decrease the contact angle as the morphology of coatings become less porous. The water contact angle reduces as the amount of PMMA increases, possibly because the rough structure formed by silica particles is reduced by the presence of the soft polymer. When more PMMA is added to the silica, the coating's optical transmission in the visible range is improved, as seen in Fig. 4.2. This improvement could be attributed to the soft polymer's coverage of the rough scattering centers for light. Fig. 4.4 b shows the optical photograph of water drop on 4 vol. % PMMA-modified silica coatings.

4.5 Self-Cleaning Ability of Coatings

Fig. 4.5 Self-cleaning abilities of 4 vol % PMMA modified silica coatings

Superhydrophobic coatings have unique self-cleaning abilities due to their water-repellent properties. These coatings are designed to mimic the natural water-repellent properties of lotus leaves and other plants, which have evolved over time to keep themselves clean and dry in wet environments. The term "superhydrophobic" refers to surfaces that are extremely difficult to wet with water. This is achieved through the use of a coating material that is highly hydrophobic, meaning it repels water molecules. When water comes into contact with a superhydrophobic surface, it forms droplets that roll off the surface rather than wetting it.

This rolling action of water droplets on a superhydrophobic surface allows them to pick up dirt and other contaminants as they roll, effectively cleaning the surface in the process. The self-cleaning ability of superhydrophobic coatings is due to the fact that dirt and contaminants cannot stick to the surface due to their water-repellent properties. The self-cleaning properties of superhydrophobic coatings have numerous applications in a wide range of industries. For example, these coatings can be used to protect electronic devices from water damage, as well as to keep buildings and other structures clean and free from dirt and debris. One of the most promising applications of superhydrophobic coatings is in the field of transportation. By applying these coatings to the exterior surfaces of airplanes, ships, and automobiles, it is possible to reduce drag and improve fuel efficiency. This is because the rolling action of water droplets on a superhydrophobic surface creates a thin layer of air between the droplet and the surface, reducing the amount of friction and drag.

The unmodified coatings show poor self-cleaning ability whereas modified coating shows the best self-cleaning ability as shown in Fig. 4.5.

5 conclusions

Superhydrophobic coatings with self-cleaning abilities have emerged as a promising solution for a wide range of applications. These coatings not only repel water but also effectively clean the surface by rolling off water droplets with contaminants. The self-cleaning ability of superhydrophobic coatings has numerous practical applications, from protecting electronic devices to improving the efficiency of transportation. Furthermore, these coatings have a significant impact on reducing environmental pollution by minimizing the use of water and chemical cleaning agents. As research continues in this field, it is expected that new and innovative applications of superhydrophobic coatings with self-cleaning abilities will emerge, making our daily lives easier and more sustainable.

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A study of amenities in Mauje Ambap village using Q-GIS technology

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Abstract

In the current situation, the importance of technology is increasing in all areas of the world. In such a situation, if technology is used in all the work systems, administration, business, structure etc. in the rural area, solutions to the problems of the rural life can be found in a modern way. In this study, the current status of amenities and essential services in Mauje Ambap village located in Hatkanangale taluka of Kolhapur district has been mapped using Q-GIS technology. For this, GPS-Waypoint mobile application has been used to take the location of all the facilities and put them in the map of Ambap village. While all the amenities were arranged separately, the problems came to the fore. Inequality is seen in the distribution of factors like medical, grocery stores, education etc. The map prepared from the said study can be viewed online with the help of the website to the administration and citizens of Ambap village so that it will help for future business location.

Keywords: Village Information System, Q-GIS, Health facilities, Grocery, Public Services etc.

1. Introduction:

In today's world it is essential to have complete information about every location and region. In absence of updated and accurate information about all kind of resources at village level, the government and people of the nation are handicapped in planning and controlling their own destiny (Khan, Subhan and others, 2005). For the present study, researcher has used remote sensing (Remote Sensing) and GIS at various government and private levels. (GIS) technology has made satellite imagery and statistical information available. Therefore, the level of development and necessary factors of any region of the world can be estimated. This new technology can reduce the time and cost for the development of an information system and help the planners in organizing the data to arrive at precise conclusion and decisions (Sitender and others 2012).

Village Information System (VIS) is crucial in regional planning of rural development. In this study, the rural information system of Mauje Ambap village in Hatkanangle taluka of Kolhapur district of Maharashtra has been studied. The distribution of road network, water facilities, land use for various purposes, education facilities, construction, other facilities, essential services etc. in Mauje Ambap can be understood at the local level with the help of various statistical and geographic information. As a result comprehensive management and planning of Mauje Ambap village will be easy. Therefore, many problems can be solved together.

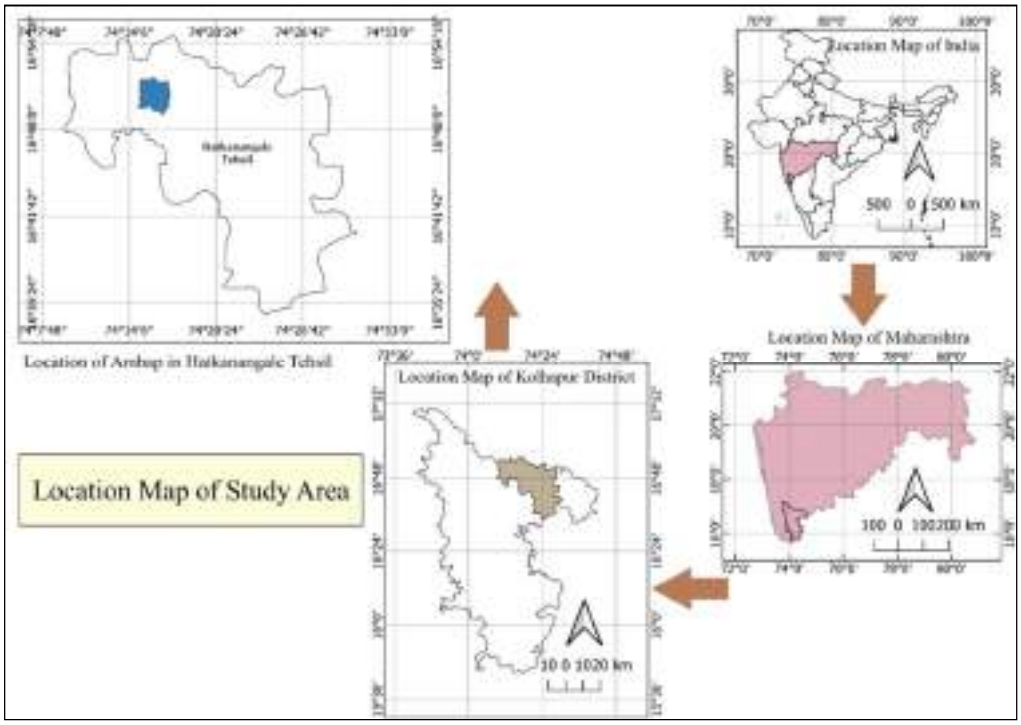
2. Study Area:

The village Mauje Ambap selected for the present study is located in the western part of Hatkanangle taluka of Kolhapur district of Maharashtra state. 22 km from Kolhapur city. In the north, Hatkanangle is 23 km north-west of the taluka headquarters and is bounded by settlements like Talsande in the north, Peth Vadgaon in the east, Ambapwadi in the south and Padali in the

west. The latitude and longitude position of this village is 16° 81' 88.35" to 16° 86' 22.31" north latitude and 74° 24' 92.87" to 74° 28' 41.05" east longitude respectively. According to the 2011 census, Mauje Ambap had a population of 6,661. So total houses are 1354. The literacy rate here is 74.1 percent. As Mauje Ambap is located in the eastern region of Kolhapur district, this area is a part of Deccan Plateau and the topography here is flat. A very slight difference in elevation occurs due to local stream mining. The maximum height here from the sea level is 520 m. is The slope of the land is generally from southwest to northeast. The maximum and minimum temperature observed in Mauje Ambap is 39° C respectively. Average annual rainfall is 600 mm. Average humidity is 70 percent.

Map No. 1

Location of Mauje Ambap



Source: Prepared on QGIS software.

3. Objectives of the Study:

1) To create a basic map of rural information system related to facilities of study area.

2) To analyze all existing infrastructure and other amenities.

3) Publish village information system map online on website.

4. Importance of Study:

1) For the purpose of management and planning of the rural area at the local level, the statistical information about the basic amenities of Ambap village can be obtained.

2) The base map will be useful for the purpose of making suggestions regarding the current status of Mauje Ambap village and any future spatial planning.

5. Methods of Data collection and Analysis:

Primary and secondary sources of information were used for this study. The primary information is obtained through direct observation and interviews as well as available service

facilities using smart phones with the help of GPS Waypoint application in which the absolute position is obtained. Whereas the secondary information has been collected from various gram panchayat reports, information, government documents, government reports, census information etc.

QGIS, an open source software, has been used for analysis and map creation for this study. Also, the infrastructure map has been published with the help of the website www.github.com.

6. Limitations of the study:

a) Due to the settlement pattern of Mauje Ambap village, there were difficulties in getting information about the actual absolute location of service facilities.

b) Since the maps used for this study are to be prepared at the local level, there may be slight variation in map accuracy. Google image has been used instead of satellite image for this.

7. Explanation of Mauje Ambap Village Amenities:

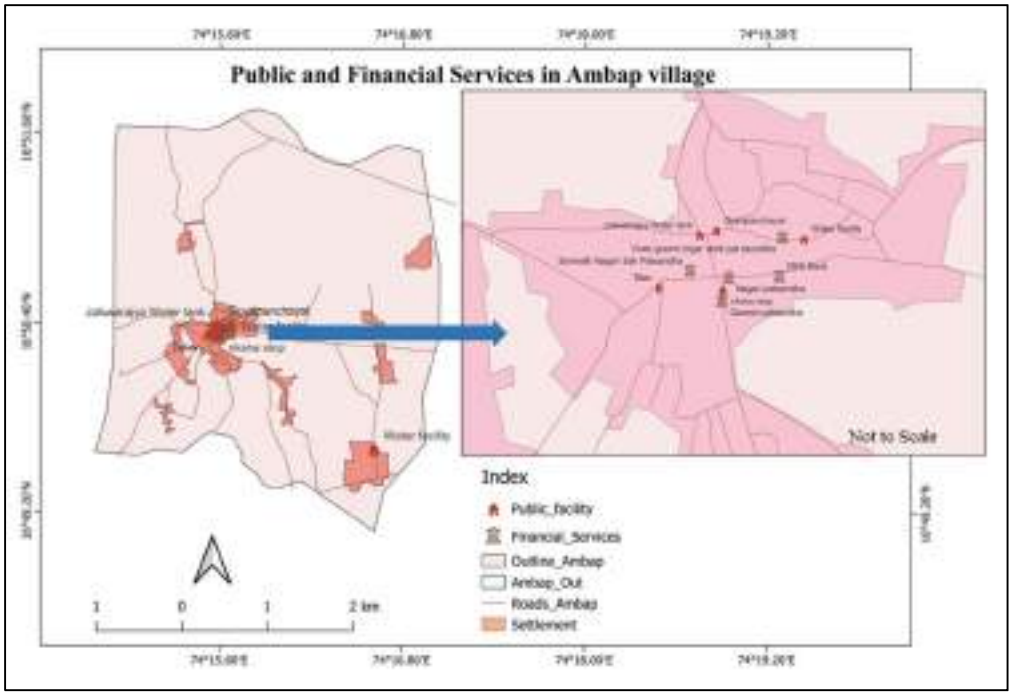
In the said study all the factors have been differentiated with the help of MS-EXCEL using mobile application GPS Waypoint to show all infrastructure and other amenities distribution in Ambap village. The distribution of each amenity is shown below using Q-GIS, an open-source software.

7.1. Public and Financial Services:

Public service facilities in Mauje Ambap village include administration, drinking water facilities, public toilets, etc. At the same time, credit institutions and private banks appear in the necessary services for financial transactions. They are shown with the help of the following map.

Map No. 2

Public and Financial Services in Ambap village



Source: Prepared on QGIS software.

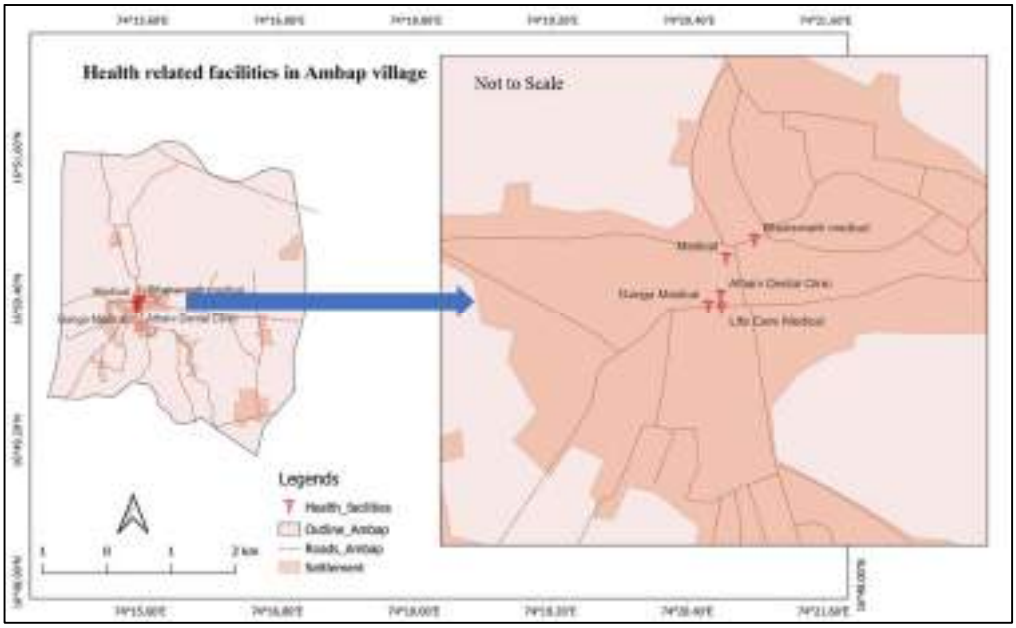
It can be seen from the above map that drinking water and all financial facilities are not available by the local administration to the far developed settlements of Ambap village. Except the village and industrial estates in the eastern part of the village, any settlement has to depend on ground water for drinking water. Private financial services such as credit institutions and nationalized banks except private banks are not available in the village. Therefore, citizens are forced to use financial services in Peth Vadgaon, Wathar and Kodoli. As there is no ATM facility in the village yet, one has to go outside to withdraw money.

7.2. Medical Services:

In Mauje Ambap village, the medical services available in neighboring Peth Vadgaon and Kodoli villages as well as all the highest facilities available in Kolhapur district, except for one private and one government hospital, do not have all the facilities.

Map No. 3

Health related facilities in Ambap village



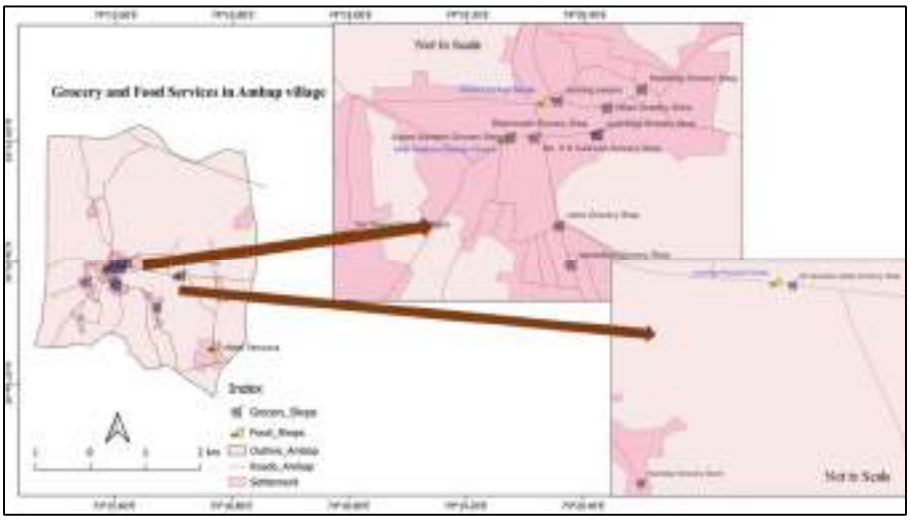
Source: Prepared on QGIS software.

At the same time, total 4 medical heads are in Gavthan area. But to get any medical supplies, residents of neighboring colonies and plantations have to come to the commercial area in the center of the village.

7.3. Essential household goods and food services:

Map No. 4

Grocery and food services in Ambap village



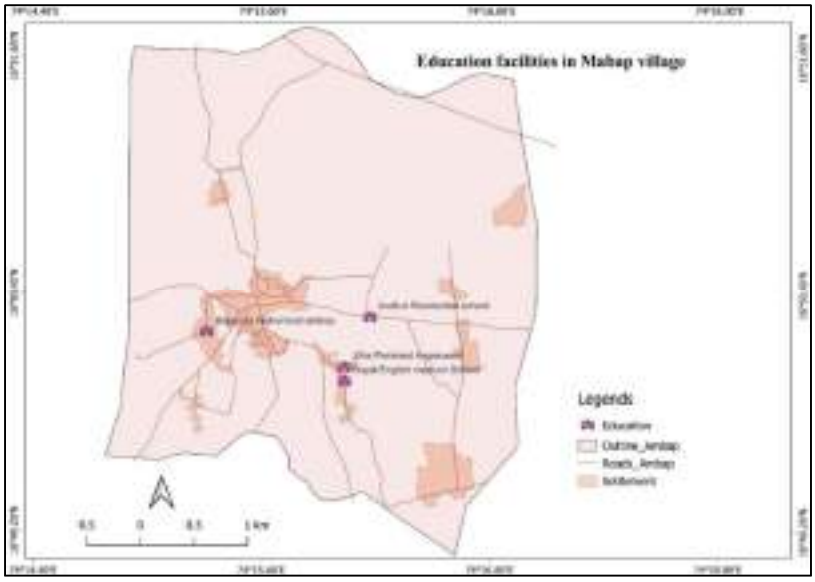
Source: Prepared on QGIS software.

Grocery stores and chicken shops in Ambap village are found to be satisfactorily distributed as per demand. On the Peth Vadgaon-Ambapwadi road, grocery stores are mainly seen outside the village.

7.4 Educational Facilities:

Map No. 5

Education facilities in Ambap village



Source: Prepared on QGIS software.

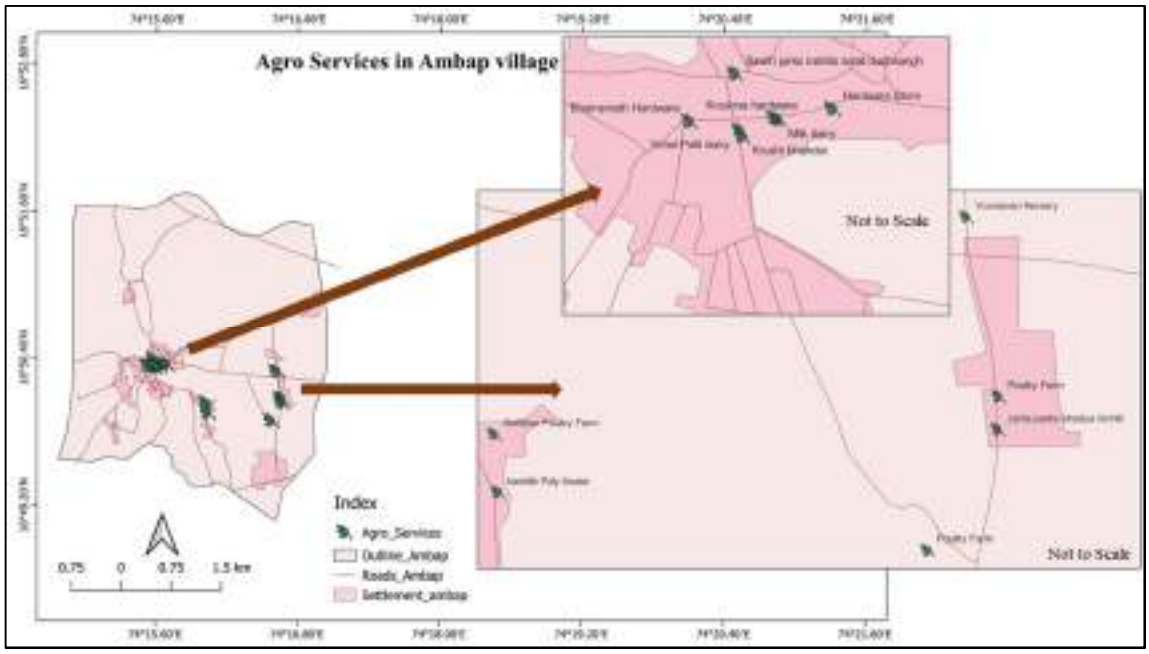
Due to the educational facilities developed in neighboring Peth Vadgaon and Kodoli, education services such as Anganwadi, Zilla Parishad School, High School and Residential School have been distributed.

7.5 Agricultural Services:

In Ambap village, apart from the main village, there is no work related to agricultural services in other settlements. Only poultry farms, poly houses and nurseries are seen in village areas.

Map No. 6

Agro-services in Ambap village

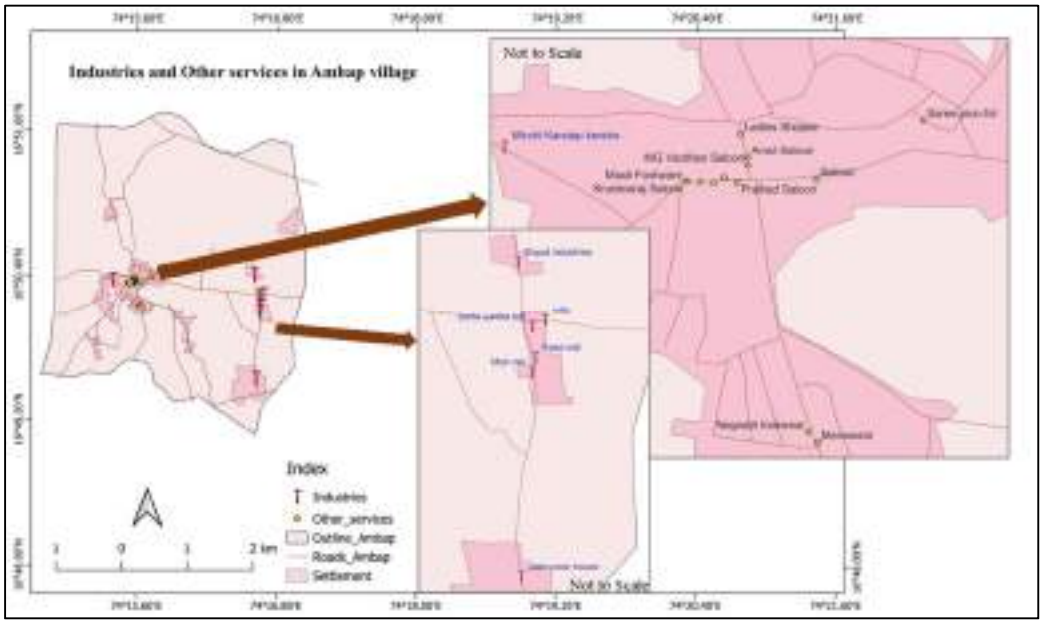


Source: Prepared on QGIS software.

7.6 Industry and Other Services:

Map No. 7

Industries and other Services in Ambap village



Source: Prepared on QGIS software.

In Mauje Ambap village, industries have developed in the eastern part of the village at appropriate locations. Chilli kandap is a household auxiliary industry seen in village areas. At the

same time, other facilities such as hairdressing salon, cloth shop, pico-fall, footwear are concentrated in the main road and village panchayat road in the Gavthan area of the village.

8. Village Information System Website Information:

https://dineshbhandare.github.io/Ambap-village-information/

9. Essential amenities required in Mauje Ambap:

a) ATM Center b) Four wheeler garage
c) Nationalized Bank d) Fire fighting system
E) Petrol Pumps e) Senior Health Officers and Additional Beds in Government Health Centres f) Arrangements for waste collection (dry and wet waste)

9. Conclusion:

a) A web-map has been prepared using the website github.com so that all the facilities in Mauje Ambap can be viewed through the internet. Availability of such a map through the internet can be beneficial for administration as well as taxation.

b) The study shows that the service facilities available in Mauje Ambap are concentrated in the center of the village on Talsande and Ambawadi streets.

c) The small scale industries of Ambap village are concentrated in the east of the village i.e. near the national highway for the convenience of transportation.

d) As the facilities in Ambap village are mainly in the center of the village, the facilities are not available in other plantations. Everyone has to travel a distance of one and a half to two km to get the essential services.

e) The main street of the village is crowded here on Saturdays as the weekly market is held.

f) People from settlements on Talsande road and Ambawadi road have to come to the village to buy and sell goods / food.

g) Shops were found less in Malwadi, a settlement in the southern part of the village. This colony has gradually grown to the south of the village.

h) According to the size of the village and considering the educational institutions in the neighboring colonies of Peth Vadgaon and Vathar, there are more educational institutions here. Also, there is a polytechnic college near the village.

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Applications used:

1) Google Earth-Pro (Windows 11)

2) GPS Waypoints (Android Application)
3) Quantum-GIS (Opensource Software)

Website used:

1) https://dineshbhandare.github.io/Ambap-village-information/

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An Assessment of Rainwater Harvesting Potential of Dr. Babasaheb Ambedkar Marathwada University Campus, Chh. Sambhajinagar (M.S.)

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-Abstract:

Rainwater harvesting contains direct collection and storage of rainwater locally with the help of various technologies, for furthermore use. It is essential for human beings, livestock, groundwater recharge, beautification practices in Dr Babasaheb Ambedkar Marathwada University campus. Potential of rainwater harvesting in this area denotes to the capacity of an individual catchment area of rooftop that connects the water falling on the catchment during a rainfall considering specific year. The present research paper emphasises the identification of potential rooftops in study area and marking it as a Polygon in Google Earth Pro and calculating the area of Rooftops of various buildings in every section. It is enormously an ideal and operative solution to overcome the water scarcity through rainwater harvesting in the study area.

Keywords: Rainwater Harvesting, Potential of rainwater Harvesting and application of QGIS

Introduction:

In digital era we have astonishing achievements in the field of Science and Technology, despite that nature remains to be a mystery for human beings. Though water is also being obtained through desalination, artificial rain by cloud seeding etc. in some of the developed countries, the shortage of water even for drinking purpose is a perpetual phenomenon throughout the world, eventually in developing and underdeveloped countries (Rain Water Harvesting and Conservation, Govt. of India, 2002 p.1).

The fact that the water resources in the world are stable and their availability is limited, the importance of water resources, efficient use of water and the use of technologies related to alternative water resources have become important (A. Yasin YİĞİT and others). Accessibility of water in an area depends on the pattern of rainfall in the region. In this point of view, Marathwada region is facing draught since last few decades due to insufficient rainfall. Due to this, water

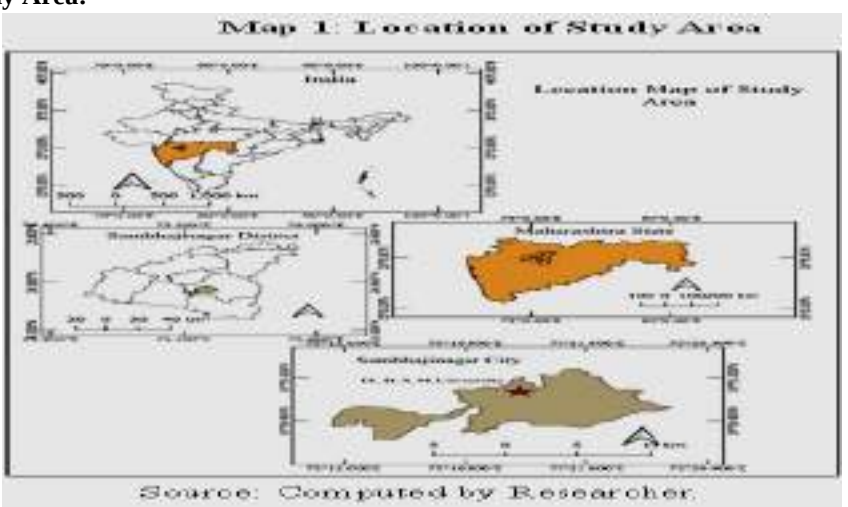
scarcity is becoming a leading problem of Sambhajinagar district as well as city. It is need of hour to find sustainable solutions for these circumstances. Rainwater harvesting is one of the effective and proficient solution to this problem. The present paper concentrated on availability of water resource for domestic purpose, nature of present-day utilization and aims at assessing the feasibility of certain traditional methods of rainwater harvesting.

Rainwater Harvesting:

Rainwater Harvesting and Conservation involve the direct collection of rainwater and storing it for direct use or can be re-charged into the Groundwater. The aim of it is to maximize water storage and minimize the runoff through drains/nallahas or to the rivers without making any use of it. Groundwater levels are depleting continuously due to ever growing demand for water (Durgasrilakshmi Hari and others, 2017).

Rainwater harvesting provide the independent water supply during regional water restrictions. It provides water when a drought occurs, can help mitigate flooding of low-lying areas, and reduces demand on wells which may enable groundwater levels to be sustained. It also helps in the availability of potable water, as rainwater is substantially free of salinity and other salts. Applications of rainwater harvesting in urban water system provides a substantial benefit for both water supply and wastewater subsystems by reducing the need for clean water in water distribution systems.

Study Area:



The study area belongs to Sambhajinagar city which is known for one of the drought-prone cities in Marathwada region. Dr. Babasaheb Ambedkar Marathwada University was established on 23rd August 1958. This university has contributed to the improvement of neighbouring regions and individuals in immeasurable ways. The university located on 19°53'26.07" to 19°54'47.69" North Latitude and

75°18’09.92” to 75º19’00.83” East Longitude, expanded over on 725 acres (2.93 Square km) surrounded by hills on north and west direction. The study area comes into semiarid climate under the Köppen climate classification. Average annual temperature ranges from 17 °C to 33 °C and average annual rainfall is 710 mm. most of the rainfall occurs in the monsoon season from June to September. The university campus consists of 52 departments, 10 hostels, 27 quarters and 23 other buildings. Approximately more than thousand people come to the campus for various purpose and more than 5000 students, faculties and guest resides in hostels, quarters and guest houses demanding much water for their daily use. Apart from that there are ‘n’ number of shrubs, lawns, trees required water. But the scenario of less rainfall resulted shortage of ground water, surface water. In this point of view, water storage is available in entire campus. For supply of enough water for all, university authority must have to hire some water tankers from outside; which is much expensive, for overcoming this critical situation there are strong need of rainwater harvesting.

Aims and Objective:

1. To make geospatial database for the potential of rainwater harvesting in study area.
2. To identify the rooftop water harvesting capacity of university campus.

Database:

The current work is based on secondary sources. For the cross verification of secondary data, the researcher used visited personally on the site and checked the infrastructure types. The data related to infrastructure like administrative buildings, departments, auditorium, indoor sports buildings, guest houses, hostels and quarters is collected from the official website of the concerned university and Google Map and Satellite image.

Methodology:

The collected data has sort out in tabular form and processed with mathematical calculations. QGIS is used to create the Study area map. Google satellite images has been used to draw and delineate different types of roof catchments and they are digitized into kml file on Google Earth-Pro software. Average annual rainfall data is considered for the assessment of potential rooftop runoff. Total three parameters i.e., available catchment area of rooftop, amount of rainfall and runoff coefficient are used for calculating the rainwater harvesting with this formula:

Where:

Table 1: Rooftop Coefficient for Roof

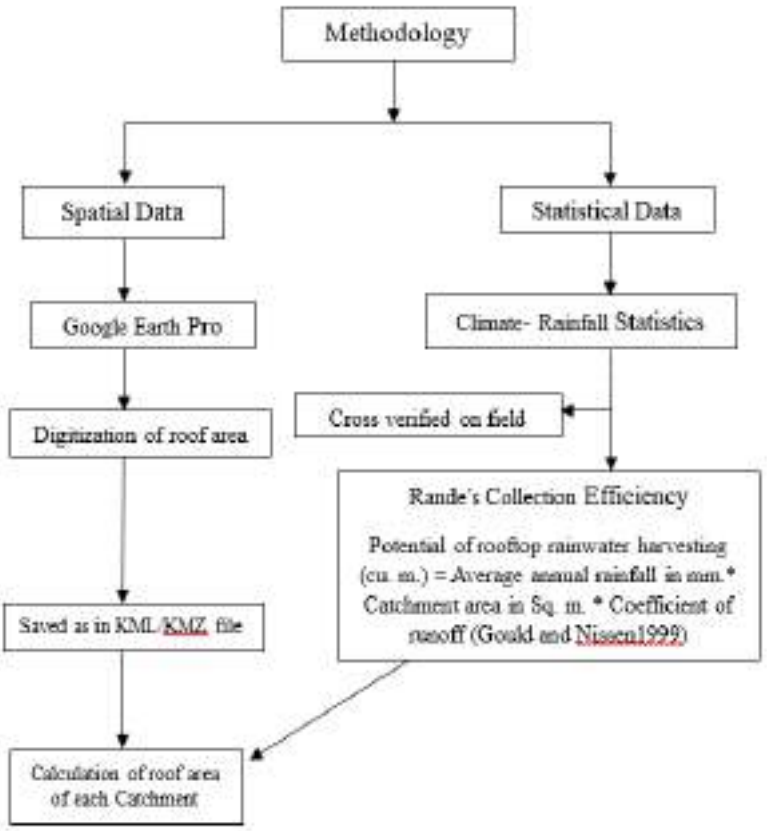
$$W = T \times A \times R$$

W	=	Water Available from Roof
T	=	Total Roof area
A	=	Average Rainfall
R	=	Runoff Coefficient

Sr. No.	Type of Roof	Runoff Coefficient
1	Galvanized Iron Sheet	0.90
2	Asbestos Sheet	0.80
3	Tiled Roof	0.75
4	Concrete Roof	0.70

Source: Report prepared by AEPRO (Action for Food Production) For UNICEF

The harvested water can be store in artificial tanks the ground water reservoirs. Capacity of tanks is estimated according to the collected water from Rooftops. The diameter and the height of the tank are proposed according to the collected water and beyond the collected water. The tank is also placed according to the area.



Limitations of the Study:

Appropriate data regarding rainfall is available for entire district and city but no reliable data available for university campus because of that amount of rainfall is taken into consideration may be erroneous for study area. The number of people inside campus is unpredictable due to that standard parameter of per capita water demand is useless for guessing the water storage. Calculated rooftop area of each building by satellite image from Google earth pro is fluctuate from actual calculations because high resolution satellite images are not simply obtainable. Spatio-temporal data is used for analysis, it will be altered with infrastructural development by university authority as well as meteorological changes i.e., amount of rainfall, rate of evaporation, temperature and humidity.

Discussion and Result:

The following study is divided into five sections as per the field visit and suitability of area for field work.

Image 1: Section-wise Distribution of Dr. Babasaheb Ambedkar Marathwada University.

SECTION I:

This section encompasses the area of university gate, buildings of bank, foreign language, music department, auditorium, hostels and teacher quarters. This section has rooftop of total 5 quarters, 2 departments, 2 hostels and 3 other buildings including a temple. The total rooftop area in this section is 3,862.42 sq. m. The detailed information is in the following.

Table 2: Rooftop rain water availability and estimated storage tank capacity in section first

Department Name	Type of Roof	Area in sq. m	Annual Rainfall	Runoff Co-efficient	Water Availability from roof in Litre
Foreign Language and Music Department	RCC	433.71	710	0.7	2,15,554.00
Temple	Iron sheet	339.08	710	0.9	2,16,672.12
Bank and Auditorium	RCC	2331.04	710	0.7	11,58,527.00
Hostel No. 4 and Mess	RCC	180.25	710	0.7	89,584.30
Quarter 1 to 5	RCC	578.34	710	0.7	2,87,434.98
Total		**3862.42**			**19,67,772.40**

Source: Computed by Researcher.

As reflection of above table no. 2, the water available from rooftop is counted in litres and total proportion of water to be accumulated during rainfall is 19,67,772.40 litres from all type of roofs in section one. The rooftop area of auditorium is found large (2331.04 sq. m.) where 58.87 percent rainfall water can be collected and will be stored on vast scale. At the other side 14.60 percent rainwater will be collected from rooftop of quarter buildings 1 to 5. An iron sheet rooftop area of existing temple in section one (339.08 sq. m.) has pay significant contribution of collecting 11.01 percent rainwater. While, maximum water used in hostel and mess but less amount (4.55 percent) of

rainwater will be collected through this building rooftop. The rooftop area of music and foreign languages department buildings donate 10.95 percent rainwater for multipurpose use. The density of buildings is less means that open space is huge in this section due that overall rainwater harvesting is less compare to other sections in university campus.

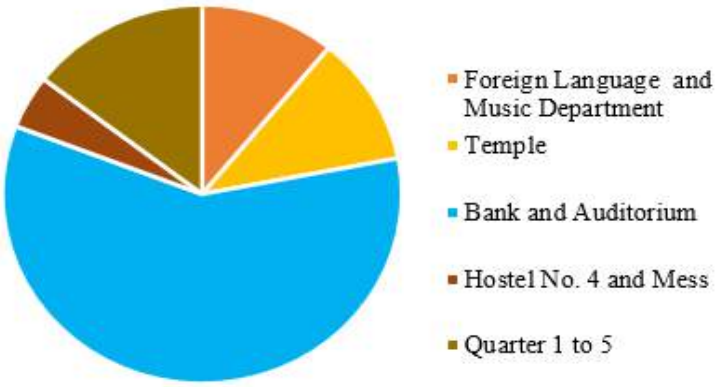


Fig. 1: Sec. 1- Water Availability from roof in Litre.

SECTION II:

Table 3: Rooftop rain water availability and estimated storage tank capacity in section second

Department Name	Type of Roof	Area in sq. m	Annual Rainfall	Runoff Co-efficient	Water Availability from roof in Litre
NIELIT_1, 2, 3, 4	RCC	5084.61	710	0.7	25,27,051.90
Farm_Building1, 2	Cement sheet	600.88	710	0.9	3,83,962.30
Vidyarthi Bhavan	Iron sheet	226.90	710	0.9	1,44,989.10
Hostel_1,2,3	RCC	1917.60	710	0.7	9,53,047.20
International_Hostel_2,3,4,5	Iron sheet	272.50	710	0.9	1,74,127.50
Inter_Hostel_6 and others	RCC	2757.55	710	0.7	13,70,502.00
Quarter for VC and faculty	RCC	1026.28	710	0.7	5,10,061.20
Total		**11,886.30**			**60,63,740.30**

Source: Computed by Researcher.

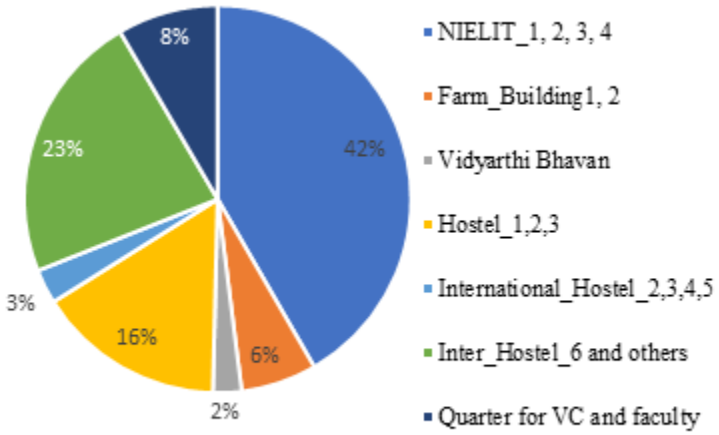


Fig. 2:Sec. 2- Water Availability from roof in Litre.

The table no. 3 portraits that, the section two has devoted to Hostels as large infrastructure, providing cumulated 43.53 percent rooftop for rainwater harvesting. As per figures came out from this table, total 60,63,740.30 litres of rain water to be accumulated during rainfall from all kind of roofs in section-2. Infrastructure capacity of NIELIT individually 41.89 percent rainwater collect and 38.51 percent water could be stored. It is higher among all buildings exist in this section. At the second side, all hostels are contributed 41.41 percent rainwater cumulatively. The rooftop of Vice-chancellor's bungalow and faculties quarters have 08.41 percent rainwater collecting capacity. Two farm building similarly contribute 06.33 percent rainwater during rainfall. While, Vidyarthi Bhavan building have iron sheet roof means runoff coefficient of this building is better than other buildings therefore, less but not least amount (2.39 percent) of rainwater collected. All hostels and NIELIT buildings might collectively catch 83.30 percent rainwater in this section.

SECTION-III

Table 4: Rooftop rain water availability and estimated storage tank capacity, in section third.

Department Name	Type of Roof	Area in sq. m	Annual Rainfall	Runoff Co-efficient	Water Availability from roof in Litre
Yoga and Drama Dept 1 and 3	RCC	1735.62	710	0.7	8,82,483.00
Drama Dept 2 and Sport Complex 1	Iron sheet	1496.25	710	0.9	9,56,104.00
Sport_Complex2, 3 and Other Quarters	RCC	2744.72	710	0.7	13,64,126.00
Hostel 1 to 6, Guest House, Yashwant Hostel	RCC	8317.9	710	0.7	41,33,996.00
Quarter 1 to 2 and 4 to 15	RCC	3713.65	710	0.7	18,45,684.00
Quarter 3	Iron sheet	219.89	710	0.9	1,40,509.71
UGC_HRDC, Humanities, RUSA, Geography Department, Post Office and other	RCC	5624.15	710	0.7	27,95,203.00
Botanical Garden	Iron sheet	370.3	710	0.9	2,36,622.00
Total		**24,262.5**			**1,23,54,727.70**

Source: Computed by Researcher.

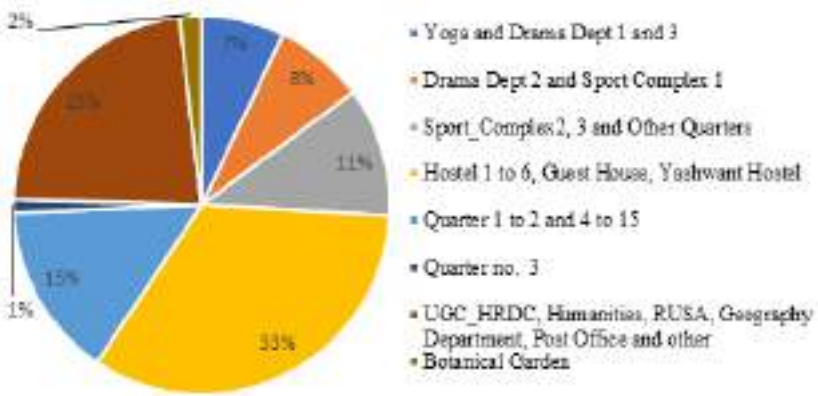


Fig. 3: Sec.3- Water Availability from roof in Litre

Section third in university campus has second largest capacity of collecting and storing rainwater during rainfall because density of buildings is higher than other sections in the campus. Table no. 4 represent that, Hostel 1 to 6, Guest House and Yashwant Hostel has 33.46 percent rainwater collecting capacity. While, UGC, RDC, Humanities, RUSA, Geography Department, Post Office and other buildings collectively has second largest size of rooftop for collecting 22.62 percent rainwater. Total 3713.65 sq. m. rooftop area of Quarters 1, 2 and 4 to 15 from this section have 14.93 percent rainwater collection and 17.31 percent storing volume. At other side, Sport_Complex2, 3 and Other Quarters could accumulate 11.04 percent rainwater.

Similarly, 07.74 percent rainwater might be cached by rooftop of Drama Dept 2 and Sport Complex 1. The roofs of buildings 1 and 3 Drama and Yoga Department can collect 7.14 percent rainwater throughout the year during rainfall. A corny building in botanical garden with iron sheet roof having 01.92 percent rainwater collecting capacity. The smallest (219.89 sq. m.) iron sheet roof of quarter no. 3 has able to contribute 01.14 percent rainwater. The overall capacity of storing rainwater collected from all rooftops available in this section is 1,47,04,727.61 litres. It will be more helpful to make self-sufficient to this section along with surrounding premises too.

SECTION-IV

Table 6: Rooftop rain water availability and estimated storage tank capacity in section fourth

Department Name	Type of Roof	Area in sq. m	Annual Rainfall	Runoff Co-efficient	Water Availability from roof in Litre
Physics, Management, UNIC, IT Dept., Botany, Mathematics, Environment, Zoology, Chemistry, Biodiversity Studies	RCC	10279.02	710	0.7	51,08,672.94
Central Workshop and Facility centre	RCC	3903.26	710	0.7	19,39,920.00
Bajaj Incubation Centre	RCC	1766.35	710	0.7	8,77,876.00
Canteen	Iron sheet	130.25	710	0.9	83,229.75
Phule Ambedkar Centre	RCC	957.48	710	0.7	4,75,867.56
Total		**17,036.36**			**84,85,566.00**

Source: Computed by Researcher

The fourth section includes the various department buildings rather than other infrastructures due to the proximity of Administrative Area. In this section, Central facility centre, Chemistry building and Computer and IT building have high capacity to collect the rainwater. The total rainwater collection availability from roof is 84,85,566.00 litres. Table no. 06 represents that, the highest 60.20 percent rainwater collected and 60.82 percent might be stored trough rooftop of Physics, Management, UNIC, IT, Botany, Mathematics, Environment, Zoology, Chemistry, Biodiversity Studies department buildings. Central Workshop and Facility centre has 22.86 percent second largest capability of collecting rainwater in this section. Then, Bajaj Incubation Centre in this premises is play important role in collecting 10.35 percent rainwater. While, roof of Phule Ambedkar Study Centre has ability to catch 05.61 percent rainwater during rainfall. Iron sheet roof of canteen in this section is could collect 0.98 percent rainwater during rainfall throughout the year.

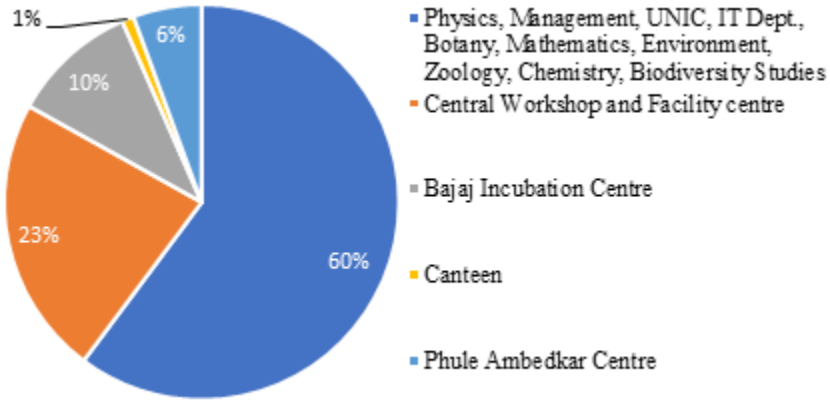


Fig. 4: Sec.4-Water Availability from roof in Litre.

SECTION-V

Table 7: Rooftop rain water availability and estimated storage tank capacity in section fifth.

Department Name	Type of Roof	Area	Annual Rainfall	Runoff Co-efficient	Water Availability from roof in Litre
Lib. Science, Tourism Management, Reading Room, Study Centre	RCC	5443.45	710	0.7	27,05,394.65
NSS, Dept1	RCC	559.15	710	0.7	2,77,897.55
NSS, Dept2	Iron sheet	443.2	710	0.9	2,83,204.80
University Administrative Building	RCC	4576.99	710	0.7	22,74,764.03
University Parking1, 2, 3	Iron sheet	604.9	710	0.9	3,86,531.10
DLLE	Iron sheet	416.54	710	0.9	2,66,169.06
DLLE Parking	Iron sheet	270.2	710	0.9	1,72,657.80
Exam Section and Parking1,2,3,4	Iron sheet	1733.84	710	0.9	11,07,923.76
Exam Section, Commerce, Bhasha Bhavan, DLLE2	RCC	4576.35	710	0.7	22,74,445.95
Bhasha Bhavan Parking	Iron sheet	1211.6	710	0.9	7,74,212.40
E-Learning Centre, History Museum, Lunch House, Parking, Printing Press	Iron sheet	4286.77	710	0.9	27,39,246.03
History Museum and Printing Press Building	RCC	1446.87	710	0.7	7,19,094.39
Total		**25,569.86**			**1,39,81,541.52**

Source: Computed by Researcher.

In section fifth, density of building is higher than all existing sections in university campus. Another notable thing is that, highest amount of rainwater collection

is 1,39,81,541.52 litres due to most of the roofs are made from Iron sheet. Principal reason of having iron sheet roof in this section is availability of parking shade and administrative facilities provided by university authority around the administrative building. The highest 19.59 percent of rainwater collection is possible by rooftop of E-Learning Centre, History Museum, Lunch House, Parking, Printing Press buildings. In the same way, roofs of Library Science, Tourism Management, Library Reading Room, Study Centre constructions having a capability to collect 19.35 percent rainwater. University Administrative Building individually able to catch 16.27 percent. Similarly, Exam Section, Commerce, Bhasha Bhavan, DLLE2 buildings also collectively would be able to collect similar 16.27 percent conceivable rainwater during rainfall. Whereas, Exam Section and Parking1, 2, 3, 4 are sufficient to collect 07.92 percent rainwater. At the other side, Bhasha Bhavan Parking (05.54

percent) and History Museum and Printing Press Building collect 5.14 percent rainwater from their respective roofs. During precipitation, smaller but noticeable amount of rainwater collect from varied roofs by University Parking1, 2, 3 (02.76 percent), NSS Department-2 (02.03 percent), NSS Department-1(01.99 percent), DLLE building (01.90 percent) and DLLE parking (01.23 percent).

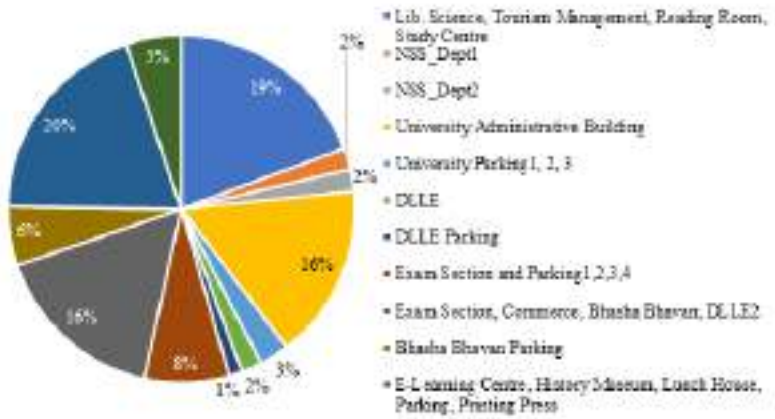


Fig.5: Sec.5-Water Availability from roof in Litre

Summery and Conclusion:

Sambhajinagar city is in central Marathwada region of Maharashtra state well known as industrial and tourism hub but from several years back this city is facing draughts. Dr. Babasaheb Ambedkar Marathwada University is leading university in north Marathwada region in this point of view more than 5000 students, faculty, and guests resides within the campus demanding enough water for domestic use but existing sources are unable to fulfil this demand because of less rainfall scenario. To overcome the problem of water scarcity rooftop water harvesting is most essential for this area.

The entire campus has much potential for rainwater harvesting. Through this method the all components of the university campus can use sufficient water stored by them.

Conclusion:

1. It is found that no effective measures taken towards rain water harvesting in study area. This resulted into scarcity of usable water in campus.
2. As per the calculated area of rooftop rainwater harvesting potential section-Five has highest potentiality out of all remaining sections.
3. In case of Section-Three the proportion of RCC buildings is higher than other sections. Whereas section-five in study area has higher proportion of buildings having iron sheet roof it means that the coefficient of iron sheet roof is higher than RCC roof. This will helpful to collect rooftop rain water in high proportion from iron sheet.
4. The large infrastructures in study area have high potential for rain water harvesting.
5. With the help of roof top rain water harvesting technique entire campus of this university can become self-sufficient.

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Applied Physics A
Materials Science & Processing

Nanocrystalline TiO_2 sensitized with CdS quantum dots for photoelectrochemical study

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Abstract
CdS quantum dots sensitized TiO_2 nanocrystalline photoanode was developed on conducting FTO substrates which act as working electrode in photoelectrochemical cells. Deposition process was conducted by applying ionic layer adsorption and SILAR process. The thickness of CdS quantum dots (QDs) are maintained by cycles of SILAR. The morphology and nature of TiO_2/CdS photoanodes are characterized by XRD, UV–Vis., IR, PL, TEM and EDS analysis. XRD patterns indicate the presence of anatase TiO_2 and CdS in TiO_2/CdS quantum dots thin film (5 and 10 cycles) samples with crystallite size 11.19 nm. The optical band gap energies are 3.10, 3.05 and 2.78 eV for TiO_2, TiO_2/CdS quantum dots (5 and 10 cycles), respectively. The band gap energy of TiO_2 found to be decreases with the sensitization of CdS quantum dots. The images of HR-TEM confirm the formation of a heterostructure between TiO_2 and CdS quantum dots. The PEC performance for TiO_2/CdS photoanode was analyzed using a 500 W tungsten lamp with light intensity of 30 mW/cm^2 in the electrolyte iodide/polyiodide as a redox couple (0.5 M). CdS quantum dots sensitized TiO_2 film as a photoanode for solar cells produces good power conversion efficiency of 1.32 and 3.52% for 5 and 10 cycles respectively.

Keywords Titanium dioxide · Nanocrystalline · X-ray diffraction · Sensitization · Band gap · Photoelectrochemical efficiency

1 Introduction

In the last two decades there is a significant development in solar cell research together with silicon, perovskite (PSCs), dye-sensitized (DSSCs), organic (OSCs), and heterojunction solar cells [1]. QDs have become substantially engrossed in solar cells due to their unique electronic and optical properties, tunable band gap by manipulating their sizes, large intrinsic dipole moments, and intrinsically stronger light absorbers. The ability of tuning of QDs band gap to match the sunlight spectrum which makes them attractive candidate as a sensitizers in solar cells [2, 3]. Normally the QDSSCs operating under concentrated sunlight can have maximum theoretical conversion efficiency by conventional solar cells-up to 66%, compared to 31% for current-day 1st and 2nd generation [4]. Meanwhile, the 3rd generation solar cells include DSSCs, QDSSCs and PSCs cells are much lower in cost and photoelectric conversion efficiency around 40% according to theoretical calculations [5]. QDSSCs are very promising 3rd generation solar cells have already made progress in photovoltaic efficiency up to 12%, very close to its counterpart of DSSCs [6]. However, DSSCs efficiencies are still lagging behind and highest yield obtained is 11.9%, which is lower than that of perovskite solar cells (19.7%) [5]. The state-of-the-art of QDSSCs surpassing 15% of power conversion efficiencies [7].

A perfect QDSSCs, just like DSSCs, contains QDs sensitized a wide band gap semiconductor film electrode, counter electrode and an electrolyte with redox couples. The wide band gap semiconductor such as ZnO–SnO_2 nanocomposites (NCs), TiO_2 nanorods (NRs), TiO_2 nanoparticles (NPs) and ZnO NPs are played a major role in the transportation of generated electrons and back recombination rates [8, 9]. But the QDSSCs are the next improvement of DSSCs in uplifting efficiency by sensitizing with semiconductor QDs. The

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emergent curiosity of QDs is their use in cheap solar cells, which have the possibility to increase the thermodynamic conversion efficiency above the Shockley–Queisser limit (33%) [10]. Enhancing the power conversion efficiency of QDSSCs has always been a predominant concern for all scientists. Light capturing quantum dot decorated, wide band gap nanostructure like TiO_2 [11], ZnO [12, 13], and SnO_2 [6, 14] have to harvest more light. Moreover, One-dimensional TiO_2 nanostructures have been regarded as ideal candidates for solar energy conversion due to their unique structural merits including large surface-to-volume ratio, fast and long-distance charge transport, and low rate of recombination of electrons and holes [15]. Also, the band gap of TiO_2 is wide (3.26 eV) which requires UV light for the excitation of electrons from the valence band to the conduction band but he solar spectrum has only 5% UV radiation [15].

Quantum dot-sensitized solar cells have developed in recent years using various inorganic QDs as sensitizers such as CdS, CdTe, CdSe, PbS, PbSe, AgI, Ag_2S, and ZnS Sb_2S_3 etc., by SILAR method which exhibited more benefits over organic dyes [5, 6, 16, 17]. Especially, CdS QDs can harvest hot electrons, generate multiple electron–hole pairs, conduction band is more negative than TiO_2 and be designed with intermediate band, which offer chance to achieve considerable high performance solar cells [18].Taking into an account of CdS QDs prominence in photochemical cell, the various thickness of CdS on TiO_2 QDSSCs found enhanced (13%) efficiency in comparison with that of bare CdS QDSSCs [19], Sun et al., has achieved 4.15% efficiency by CdS QDs sensitized TiO_2 nanotubes-array photoelectrode [20]. The CdS/CdSe co-sensitized solar cells with CdS QDs doped by Mn^{2+} and found to be 5.4% efficiency [21]. The CdS/CdSe co-sensitized TiO_2 nanotube arrays found efficiency around 4.61% [22]. Also, CdS QDs are deposited by SILAR and CBD method which produce the required surface coverage of quantum dots on TiO_2 [23–25]. To the date, the eco-design carbon dots from rosemary leaves [26], inorganic leaf CdS-$BiVO_4$ [27] and rGO [28], ink-based deposition of ZnxCd1-xS buffer layers in CZTS [29] photoelectrodes are targeted to construct solar cells. The efficiency (11, 9% DSSCs, while for QDSSCs, 11.6%) and low stability are the most important challenges for the commercial deployment of both technologies will be satisfied in the near future by QDs with high absorption coefficient [30].

The present work represents development of CdS QDs deposited by SILAR on anatase TiO_2 thin film by chemical method. These two methods are easy to process, good surface coverage and produces a high-quality films at low temperature. The number of deposition cycles that is CdS QDs loading density was varied to study the effect on the photoelectrochemical performance of TiO_2 and optimized thickness of CdS QDs which improved the photoelectrochemical efficiency.

2 Experimental details

2.1 Materials

Nanocrystalline TiO_2 photoanode was fabricated on FTO ($60\times15\times3.2$ mm, surface resistivity 8 Ω/sq, Transmittance 80–81.5%) and commercial glass substrates ($75\times25\times2$ mm) by a chemical bath deposition method. Titanium tetra-isopropoxide (TTIP) and Isopropanol are purchased from Sigma-Aldrich Chemie, India. Double distilled (DW) water was used through the experimental part.

2.2 Fabrication of TiO_2 photoanode

In a typical procedure, 4 mL of Titanium tetra-isopropoxide and 16 mL isopropanol are mixed and stirred for 10 min to achieve a homogeneous solution. The FTO and glass substrates (area: 2.5×2.5 cm^2) were carefully washed in the ultrasonic bath for 10 min with each of the two different solvents: deionized water, and acetone. After cleaning, the substrates were dried well and immersed vertically in the above bath at room temperature for five min. Afterward, substrates were removed from the bath and dried for 2 min and further immersed for 5 min. In this way, two cycles are conducted to confirm stable, uniform, adherent thin film deposition. The deposited thin film was taken out from the bath and washed with deionized water repeatedly. These films are dried at 100 °C in the oven for 2 h and followed by calcined at 400 °C in a muffle furnace.

2.3 Sensitization of TiO_2 by CdS quantum dots

The TiO_2 photoanodes are sensitized by CdS quantum dots via successive ionic layer adsorption and reaction (SILAR) method. This method facilitates fast processing as well as resulted into QDs with desired stoichiometry [19]. The FTO/TiO_2 electrodes are dipped in the aqueous solution of $Cd(NO_3)_2$ (0.05 M) for 1 min afterwards washed with distilled water and further immersed in aqueous solution of Na_2S (0.05 M) for 1 min and then rinsed with distilled water. The same cycle was repeated for 5 and 10 times. After completion of sensitization process, it was found that the white colour of the TiO_2-coated substrates changed to a light yellow or dark red brown color after the adsorption of CdS, respectively. Resulting films were designated as (a) Bare TiO_2, (b) TiO_2/CdS (5cy), (c) TiO_2/CdS (10 cy) and (d) CdS deposited by SILAR method is as shown in Fig. 1. For the CdS QDs deposition on TiO_2 films the involved chemical reaction is given below:

$$TiO_2 \xrightarrow{Cd^{2+}} TiO_2Cd^{2+} \rightarrow \text{Wash} \xrightarrow{S^{2-}} TiO_2CdS \rightarrow \text{Wash}.$$

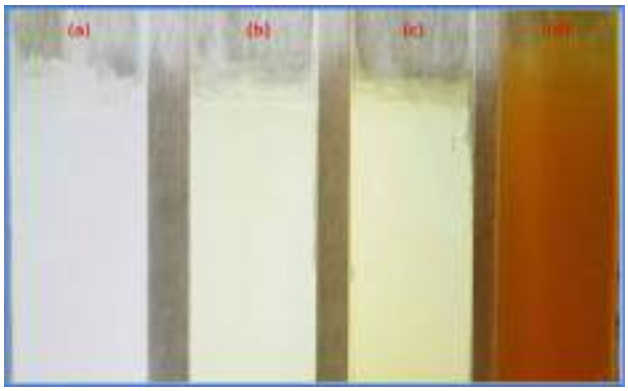

Fig. 1 Thin films of **a** TiO_2, **b** TiO_2/CdS QDs (5cy), **c** TiO_2/CdS QDs (10cy) and **d** CdS

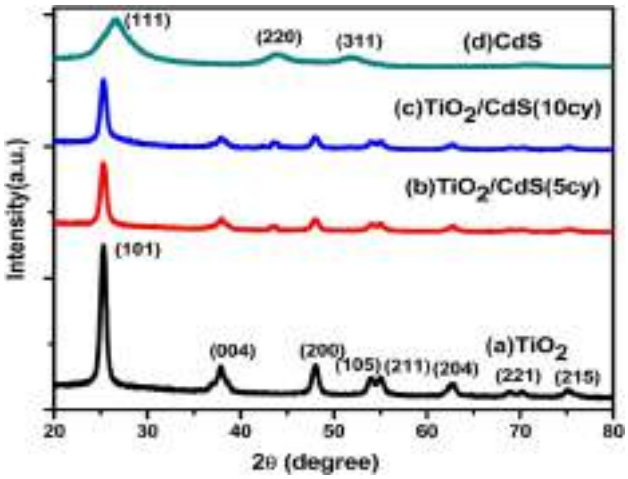

Fig. 2 XRD patterns of synthesized nanocrystalline photoanodes **a** TiO_2, **b** TiO_2/CdS QDs (5cy), **c** TiO_2/CdS QDs (10cy) and **d** CdS

2.4 Characterization techniques

X-ray diffraction (XRD) patterns of the films were recorded in a Rigaku D/MAX-2000 diffractometer, Japan, using a Cu–Kα radiation (λ = 1.54056 Å). UV- Vis. spectra of TiO_2/CdS photoanode films were obtained using (UV–Vis (DRS)-NIR V-77O, JASCO, Japan) in the wavelength range of 200–800 nm. Fourier- transform infrared (FT-IR) spectra was recorded using (FT-IR JASCO-4600) scanning from 4000 to 400 cm^{-1}. The photoluminescence spectra were recorded at 340 nm as an excitation wavelength using Spectrofluorometer (FP-8200, JASCO, Japan). The shape and size of the particles were measured using transmission electron microscopy (TEM) with a model JEOL JEM 2100 (SAIF, Shillong). Elemental mapping (EDS) of TiO_2/CdS films top surface was characterized by EDAX (PHI-1600, USA) using Mg Kα as the radiation source. The photoelectrochemical efficiency of TiO_2/CdS quantum dots photoanode films are measured using the electrochemical workstation (Autolab PGSTAT 100 Potentiostat) with two the electrode system.

2.5 The photoelectrochemical performance

The photoelectrochemical performance of the TiO_2 sensitized with CdS quantum dots was analyzed using standard two electrode configuration under dark (500 W tungsten) light and the illumination of intensity 30 and 100 mW/cm^2 with an active surface area 1 cm^2 in iodide/polyiodide (0.5 M) electrolyte as a redox couple. The iodide/polyiodide electrolyte has high reduction potential which facilitates the flow of electrons from the working electrode to the counter electrode. The measurements for the power output characteristics and I-V plots were made at fixed intervals after waiting for sufficient time to equilibrium the system (both dark as well as under illumination) [24].

3 Results and discussion

In this study, one of the simplest aqueous solution method for the deposition of QDs on to TiO_2 thin film was carried out by SILAR. Besides its simplicity, SILAR has a number of advantages: (i) it deals very easy path to deposit and dope film with effectively any element in any proportion by simply adding cationic solution, (ii) unlike closed vapor deposition method, SILAR does not require high quality substrates nor does it need vacuum at any stage, (iii) the deposition rate and the thickness of the film can be easily controlled over a wide range by changing the deposition cycles, (iv) operating at room temperature can produce films on any substance [31]. On the other hand, the CdS QDs solar cells, assembling quantum dots on TiO_2 film is a significant to decide the charge separation and transport of electrons which directly affect the solar cell efficiency. SILLAR method totally depend on rapid cations and anions are reactive in solution that provides a simple and cost-effective process to achieve desired size and thickness [2]. Also the drawback of SILAR method is possibility of leaching of elements due to utilization of films after many cycles.

3.1 Structural analysis

The XRD patterns of TiO_2, TiO_2/CdS quantum dots (5 and 10 cycles) and CdS are shown in Fig. 2. The peaks at 25.25, 37.87, 48.18, 54.06, 55.20, 62.75, 65.70, 70.29, 75.10 degree are assigned to (101), (004), (200), (105), (211), (204), (116), (221), (215) (hkl) planes observed for nanocrystalline TiO_2 thin film [24]. These planes are corresponding to the crystal structure of tetragonal anatase phase matching with the standard JCPDS (Card No. 21–1272). The crystallite size is 14.61 nm estimated using Scherrer equation.

The bare CdS shows peaks at 26.6, 43.8 and 51.8 degrees are assigned to (111), (220), (311) (hkl) planes respectively. These planes correspond to the crystal structure of cubic phase matching with standard JCPDS Card No. 10–0454 [32]. For TiO_2/CdS quantum dots (5 and 10 cycles) samples, XRD pattern shows presence of anatase TiO_2 and CdS peaks. After sensitization by CdS quantum dots, the XRD patterns showed rather weak CdS peaks at 26.6 and 43.8 degrees due to the high dispersion and low content of CdS QDs [33]. The broadening of (101) peak is observed with increase in CdS content. The crystallite size observed from the (101) peak width is 11.19 nm for TiO_2/CdS quantum dots (5 cycles) and 12.89 nm for TiO_2/CdS quantum dots (10 cycles). Such small crystallite size is a suitable parameter for solar cell efficiency.

3.2 FT-IR analysis

The characteristic peaks of the FT-IR spectra along the vibrational mode of TiO_2 and TiO_2/CdS quantum dots (10 cy) are displayed in Fig. 3. The characteristic broad peak at 3440 cm^{-1} indicates the stretching vibration of O–H of water molecules and the moisture in the processed samples. The spectra show prominent peaks at 530, 1627 and 3440 cm^{-1} for TiO_2 and TiO_2/CdS thin films. The band at 1627 cm^{-1} was attributed to the bending vibration in H–OH of adsorbed water molecule [34]. Strong band positions in the region of 900–1100 cm^{-1} may result from the sulphate group stretching vibrations. The substantial peak detected at 748 cm^{-1} corresponds to the stretching mode of the CdS bond [35]. The broad band at below 1000 cm^{-1}, with minimum values of 670 cm^{-1} and 522 cm^{-1}, can be attributed to the typical Ti–O and Ti–O–Ti stretching and bending vibrational modes of TiO_2, respectively [36].

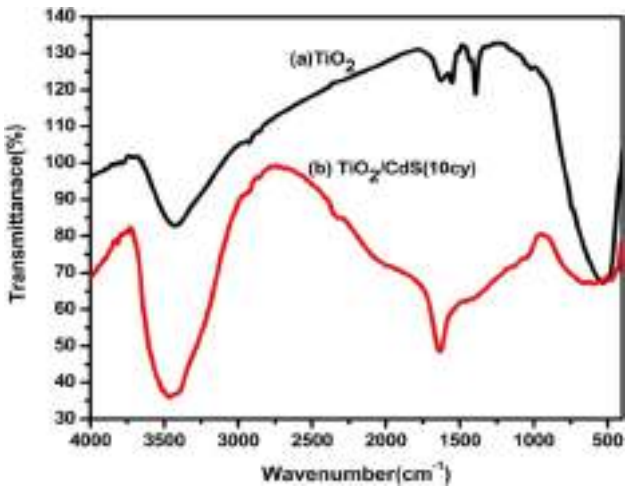

Fig. 3 FT- IR spectra of **a** TiO_2 and **b** TiO_2/CdS QDs (10cy)

3.3 TEM analysis

The TEM analysis of the TiO_2/CdS quantum dots photoanode is shown in Fig. 4a–d. The image of TiO_2/CdS indicates the CdS QDs are uniformly and densely grown over the entire TiO_2 nanocrystals by SILAR (Fig. 4a, b). The HR-TEM image (Fig. 4c) confirms the formation of a novel heterostructure between TiO_2 nanocrystals and CdS QDs. Two different lattices with d spaces 3.51 Å and 3.36 Å can be clearly found, corresponding to (101) crystal planes of anatase TiO_2 and (111) crystal planes of CdS are consistent to XRD analysis. Such heterojunction may enhance the separation of photogenerated electron–hole pairs which increases the visible light photoelectrochemical activity. The SAED image (Fig. 4d) shown the successful sensitization of CdS QDs on TiO_2 nanocrystals. In addition, the EDS spectrum of TiO_2/CdS quantum dots photoanode clearly showed only a higher percentage of titanium along with oxygen (O), Cd, S elements which established the successful construction of the TiO_2/CdS QDs as shown in Fig. 5.

3.4 Optical property

The UV–Vis. absorption spectra of TiO_2 and TiO_2/CdS quantum dots (5 and 10 cy) are shown in Fig. 6. The effect of CdS sensitization was determined from optical absorbance measurements in a wavelength range of 200–800 nm. The TiO_2 thin film shows low absorbance in the visible region and characteristic absorption wavelength is < 400 nm. However for CdS sensitized TiO_2, the absorption edge strongly expanded to the visible light region. The film of TiO_2/CdS quantum dots for 5 and 10 cycles showed the band edge absorption at 404 and 430 nm, respectively (Fig. 6b, c). Interestingly, the blue shift has been observed in the CdS QDs deposited TiO_2 thin film, indicating the size quantization effect of the nanoparticles [37]. The band gap was obtained by plotting the graph $(\alpha h\nu)^2$ versus photon energy ($h\nu$). The intercept of tangent of the plot gave a good approximation to the band gap energy for direct band gap material. Figure 7 indicates that the optical band gap energies are 3.10, 3.05 & 2.78 eV for TiO_2, TiO_2/CdS quantum dots (5 and 10 cycles). It is observed that the band gap decreases with sensitization of TiO_2 by CdS quantum dots.

3.5 Photoluminescence (PL) analysis

A photoluminescence spectrum shows signals due to recombination of charge carriers produced by photoabsorption which relates the photoelectrochemical activity of the cell. Figure 8 shows PL spectra of TiO_2 and TiO_2/CdS (10cy) QDs thin films. An intense signal observed at 378 nm for TiO_2 and TiO_2/CdS (10cy) quantum dots thin films due to near band edge emission of nanocrystalline

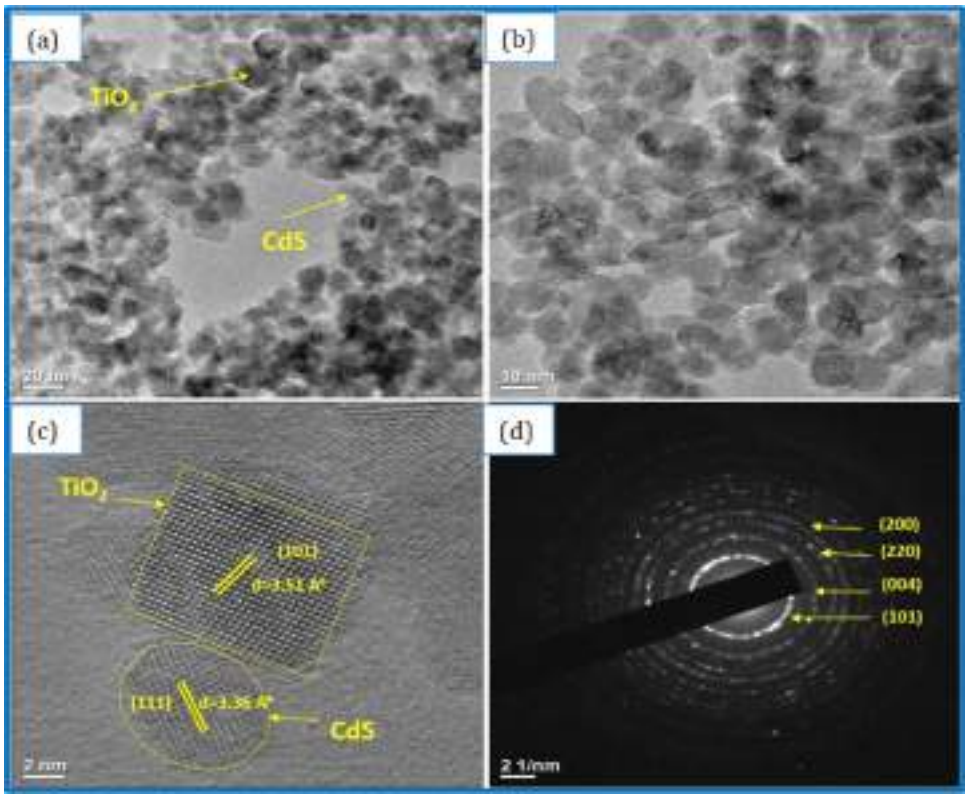

Fig. 4 **a**, **b** TEM images of TiO_2/CdS QDs, **c** HR-TEM image and **d** SAED pattern of TiO_2/CdS QDs

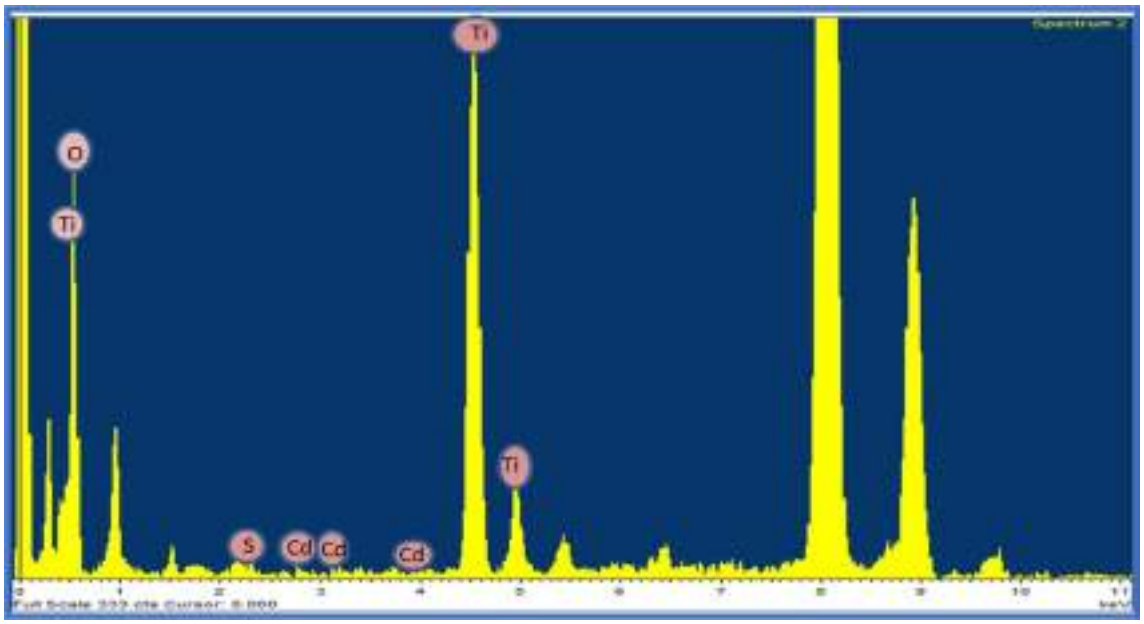

Fig. 5 Elemental mapping (EDS) of TiO_2/CdS QDs

TiO_2 as well as at 470 nm a weak signal raised due to presence of oxygen vacancy defects [38]. The CdS deposition on the TiO_2 causes reduction and quenching of the emission of TiO_2 at 378 and 470 nm respectively, indicating the passivation of TiO_2 surface and decreases the rate of recombination of photo-induced electron–hole pairs. The broad emission peak around 503 nm is observed which represents the band edge emission of CdS nanoparticles [34, 39].

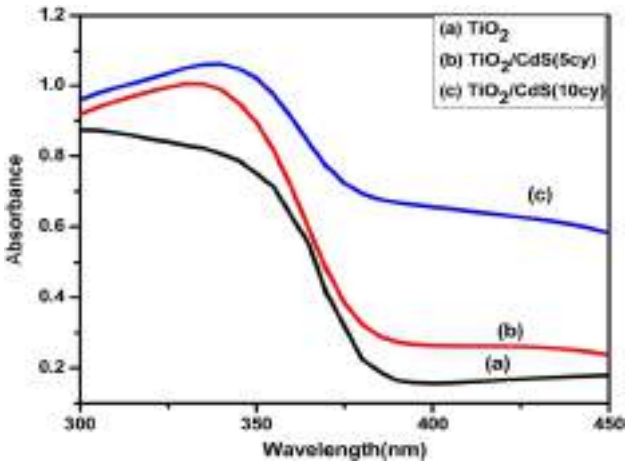

Fig. 6 UV–Vis. absorption spectra of **a** TiO_2 **b** TiO_2/CdS QDs (5cy) and **c** TiO_2/CdS QDs (10cy)

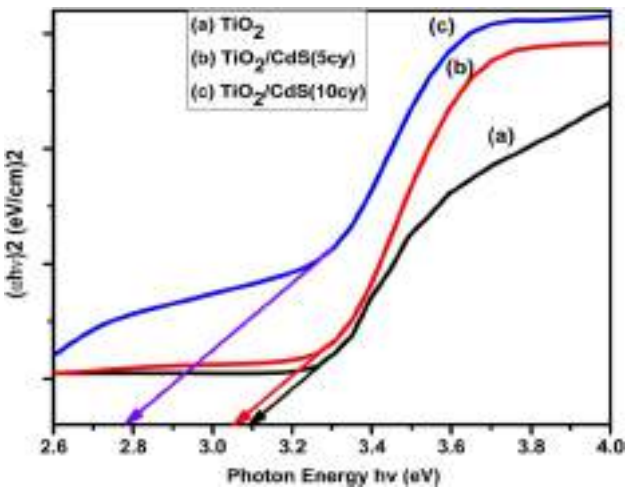

Fig. 7 Determination of band gap energy of **a** TiO_2, **b** TiO_2/CdS QDs (5cy) and **c** TiO_2/CdS QDs (10cy)

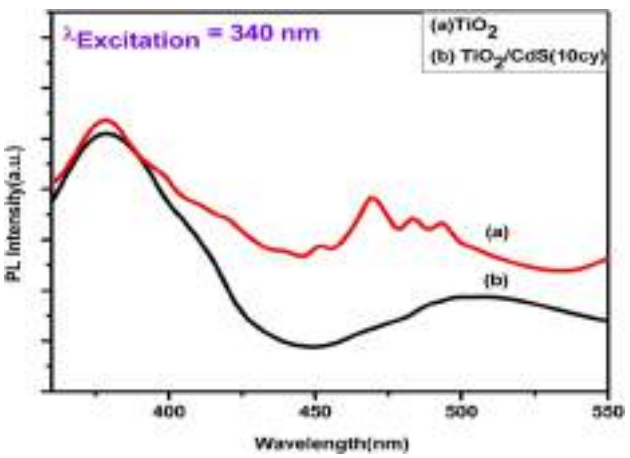

Fig. 8 Photoluminescence spectra of **a** TiO_2 and **b** TiO_2/CdS QDs (10cy)

3.6 Photoelectrochemical cell performance

The schematic mechanism of the PEC solar cell of TiO_2/CdS quantum dots photoanode was represented in Fig. 9. The current–voltage (I-V) characteristics of the TiO_2 sensitized with CdS quantum dots are measured by fluorine tin oxide (FTO)/TiO_2/CdS quantum dots/polyiodide/graphite electrode cell configuration. Figure 10 shows the current–voltage (I–V) characteristic curves of the TiO_2 sensitized with CdS quantum dots by SILAR reaction with 5 and 10 cycles. Under the light illumination, the excitons are generated by CdS quantum dots and the charge separation occurred in the TiO_2/CdS interface. The formed electrons were quickly transformed into the FTO layer through TiO_2 electrode layer and further the holes were recovered by polyiodide electrolyte. The PEC cell parameters fill factor (FF) and light conversion efficiency (η %) were calculated using the following equations.

$$\text{Fill Factor} = \frac{I_{max}.V_{max}}{I_{sc}.V_{oc}} \tag{1}$$

$$\eta\% = \frac{I_{sc}.V_{oc}}{P_{in}} \times \text{FF} \times 100, \tag{2}$$

where, I_{max} and V_{max} are the values of maximum current and maximum voltage, I_{sc} and V_{oc} are short circuit current and open circuit voltage, P_{in} is the input light intensity (30 mW/cm^2) respectively.

The PEC cell parameters such as fill factor and light conversion efficiency for sample TiO_2/CdS quantum dots (5cy) is 0.4197 and 1.32% as well as 10cy is 0.4626 and 3.52% respectively. All calculated parameters are given in Table 1.

Comparing these two samples, the TiO_2 sensitized with CdS quantum dots by 10 SILAR cycles shows more fill factor and light conversion efficiency than TiO_2/CdS quantum dots by 5 SILAR cycles. SILAR is the best method to prepare QDs which facilitates the fast processing and produces QDs with high stoichiometry. The number of SILAR cycles is an important parameter which determines the quantity and size of deposited quantum dots and PEC activity [31]. However more number of SILAR cycles limits the PEC activity of TiO_2/CdS quantum dots because of the aggregation of the CdS quantum dots which blocks the pores of TiO_2 and reduces access of the reagent and light on the surface of TiO_2 nanocrystals [40]. The photoelectrochemical efficiency of TiO_2/CdS quantum dots synthesized in present work is better as compared to other photoanodes due to uniform deposition of CdS quantum dots on nanocrystalline TiO_2 and more absorption of radiations.

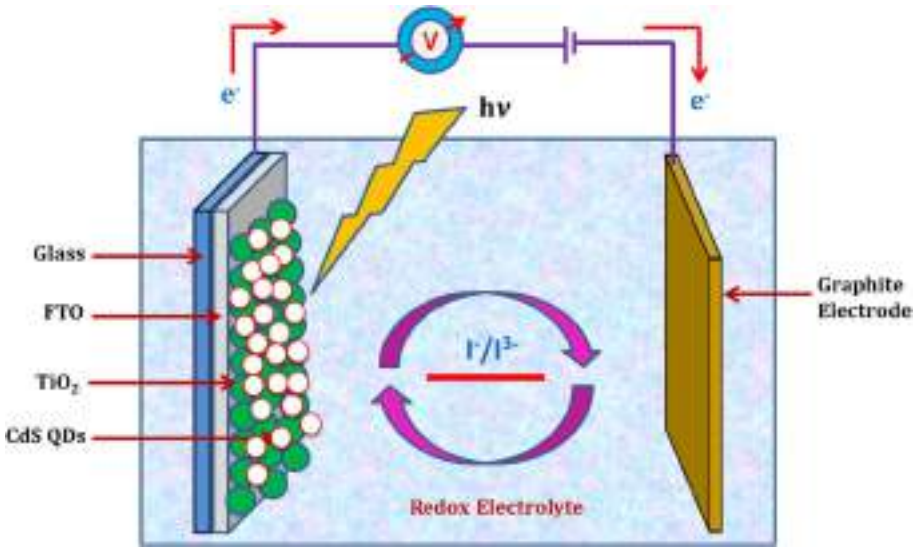

Fig. 9 Schematic of PEC cell mechanism for TiO_2/CdS QDs photoanode

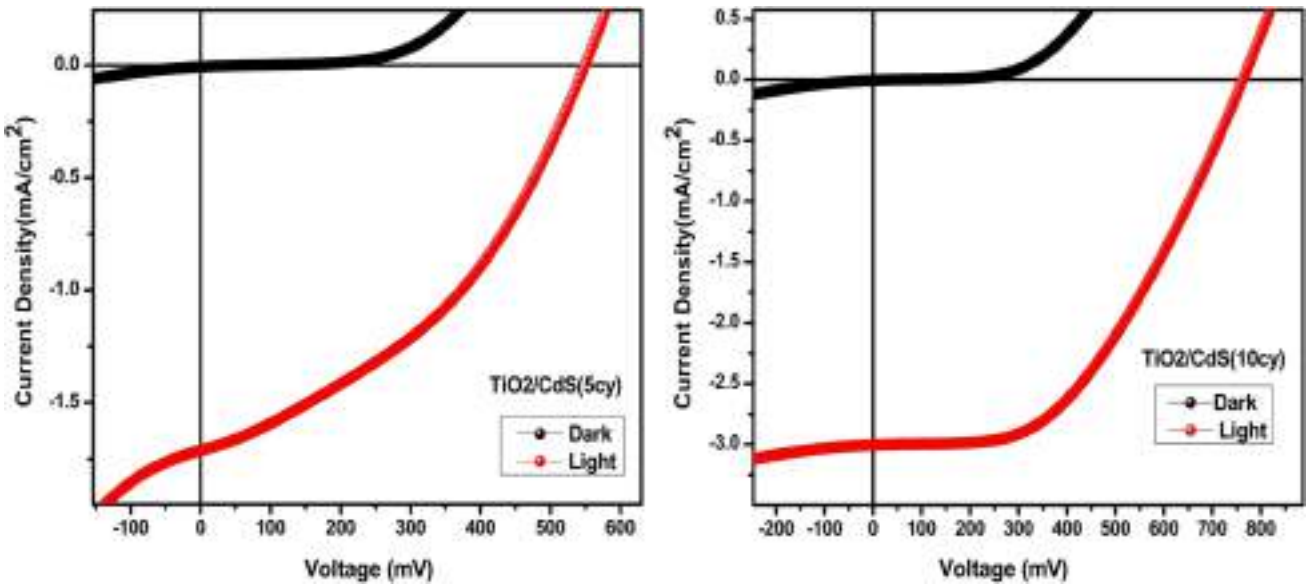

Fig. 10 *I–V* curves of nanocrystalline TiO_2 photoanode sensitized with CdS QDs

Table 1 Fill factor and power conversion efficiency of nanocrystalline TiO_2 photoanode sensitized with CdS QDs (5 and 10 cycles) under the illumination of different light intensity

Sample	I_{sc} (mA/cm^2)	V_{oc} (mV/cm^2)	I_m (mA/cm^2)	V_m (mV/cm^2)	FF	Eff. %
Light illumination intensity at 30 mW/cm^2						
TiO_2/CdS QDs (5 cy)	1.71 ± 0.1	550.49 ± 2	1.04 ± 0.1	363.76 ± 2	0.4197	1.317
TiO_2/CdS QDs (10 cy)	2.98 ± 0.1	763.26 ± 2	2.08 ± 0.1	508.38 ± 2	0.4649	3.524
Light illumination intensity at 100 mW/cm^2 (1 Sun)						
TiO_2/CdS QDs (5 cy)	7.18 ± 0.1	831.45 ± 2	5.72 ± 0.1	518.10 ± 2	0.4966	2.960
TiO_2/CdS QDs (10 cy)	10.19 ± 0.1	926.50 ± 2	9.67 ± 0.1	650.38 ± 2	0.6661	6.285

4 Conclusions

CdS quantum dots sensitized solar cells have been fabricated using nanocrystalline TiO_2 photoanode deposited with CdS layer by successive ionic layer adsorption and SILAR reaction. For TiO_2/CdS quantum dots (5 and 10 cy) samples, XRD pattern indicates presence of anatase TiO_2 and CdS. The crystallite size was found in the range of 11.19 nm for TiO_2/CdS quantum dots (5 cy). The optical band gap energy is 3.10, 3.05 and 2.78 eV for TiO_2, TiO_2/CdS quantum dots (5 and 10 cy). The band gap energy decreases with sensitization of TiO_2 with CdS quantum dots, TEM and elemental analysis confirms enhanced deposition of CdS quantum dots on TiO_2 surface. The TiO_2 sensitized with CdS quantum dots by 10 cycles shows more fill factor and light conversion efficiency is 0.4626 and 3.52% than TiO_2/CdS quantum dots by 5 cycles. This study provides a simple and rapid method to improve the performance of CdS on the anatase TiO_2 thin films QDSSCs, as promising materials for PECs customs.

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Author contributions RAP: investigation, methodology, data curation, correcting original draft, SBT: resources and formal analysis, KMG: conceptualization, writing—review and editing. VMB: writing—review and editing, and supervision.

Data availability Data will be made available on request.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

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"A Preliminary Study On Spider Diversity From Vijaysinha Yadav College Campus Peth Vadgaon, Dist. Kolhapur, Maharashtra"

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***Abstract*:**

The organisms belonging to class Insecta plays so many roles in the ecosystem, one of which is a pest. The spiders are exclusive predators of many insect pests. Hence, spiders can play a very important role in the regulation of the insect population in any ecosystem. The present study of spider diversity from Vijaysinha Yadav College Campus Peth Vadgaon, Dist. Kolhapur, Maharashtra is the first attempt to find out the diversity of spiders in the selected area. A survey was carried out in the rainy season from July 2023 to October 2023 on the campus of Vijaysinha Yadav College, Peth Vadgaon, Dist. Kolhapur. The College building and vegetation of the campus were surveyed in the morning between 08.00 am to 11.00 am weekly. A total of 31 spider species belonging to 19 genera of 09 families were identified.

Keywords: Kolhapur, Shri Vijaysinha Yadav College, Spider diversity, Vegetation

Introduction

Spiders are the predators of many insect pests as well as they are an important food source for birds, lizards, wasps, and other animals. Ground-dwelling spiders may be important in transferring energy directly from the below-ground detritus food web to the above-ground terrestrial food webs of familiar birds, reptiles, amphibians, and mammals (Johnston, 2000). Spiders are an important source of food for many birds, especially in the winter (Peterson et al. 1989; Hogstad, 1984). Spider silk is important to bird species for nest building; 24 of 42 families of passerine birds and nearly all species of hummingbird depend on silk from spiders and caterpillars for construction (Hansel 1993).

In the world, there are 49853 spider species from 131 families and 4238 genera (World Spider Catalog (2022). World Spider Catalog. Version 23.0 Natural History Museum Bern, at http://wsc.nmbe.ch, 29-01-2022. doi: 10.24436/2). Keswani and others of SGB Amaravati University have given updated Spider checklist of India in 2012 representing 1686 species from 60 families and 438 genera of spiders (Suvarna More, 2015). In India studies on Spiders were started in the late nineteenth century and it was pioneered by Stoliczka (1869). Later on, many workers have contributed to Indian Spider diversity. Gajbe (2003) prepared a checklist of 186 species of spiders in 69 genera under 24 families distributed in Madhya Pradesh and

Chhattisgarh. Patel (2003) described 91 species belonging to 53 genera from Parabikulum Wildlife Sanctuary, Kerala. Manju Silwal et al. (2003) recorded 116 species from 66 genera and 25 families of spiders from Purna Wildlife Sanctuary, Dangs, Gujarat. Suvarna More (2013) recorded 150 spider species belonging to 24 families from the Bamnoli region of Koyna Wildlife Sanctuary, Maharashtra, and 90 species of 19 families from the Zolambi region of Chandoli National Park, Maharashtra (2015).
So far nobody has worked on the spider diversity of Peth Vadgaon, Dist. Kolhapur and hence we have decided to explore the spider diversity from this area.

Study area - Peth Vadgaon is a city in the Kolhapur district of the state of Maharashtra having more than 20000 human population. It is governed by a municipal council. Peth Vadgaon is a semi-urban city with good vegetation and agricultural land. A total of 07 acres of the College campus (16.50°N 74.19°E) has all types of plantations like herbs, shrubs, trees, and climbers. Also, the campus has 03 different buildings. The present study is carried out mainly in the buildings and shrubby plants.

Fig. Location of Study area

Material and Methods

Different bushes and College Buildings were surveyed early in the morning between 08.00 am to 11.00 am weekly in the rainy season from July 2023 to October 2023. Visual search, Sweeping, Pitfall trapping, Hand collection, Litter Sampling are the different collection methods used during the present study. Identification of spiders was carried out with the available literature from Kaston, 1978; Tikader 1980; Tikader, 1987; Barrion and Litsinger, 1995 and Mujumdar, 2007. The spiders are identified mainly based on morphological characteristics, palp structure by using the literature.

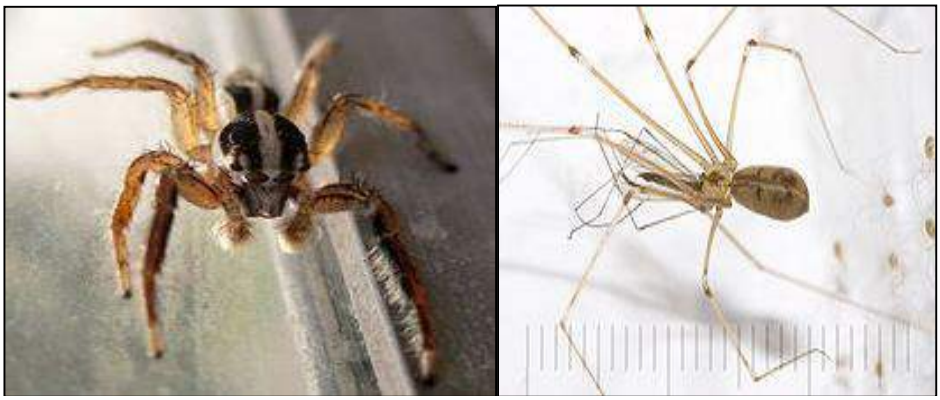
Results

Below is the list of spiders with their families observed from Vijaysinha Yadav College campus, Peth Vadgaon, Dist. Kolhapur, Maharashtra.

1. Araneidae – Orb Web Spiders
   i. *Argiope aemula* (Thorell)
   ii. *Argiope anasuja*
   iii. *Argiope pulchella*
   iv. *Gasteracantha remifera* (Butler)
   v. *Neoscona bengalensis* (Tikadar and Bal)
   vi. *Neoscona mukerjei* (Tikader)
   vii. *Poltys nagpurensis* (Tikadar)
   viii. *Telecantha brevispina* (Doleschall)
2. Corinnidae – Ant Mimicking Sac Spiders
   ix. *Castianeira himalayansis* (Gravely)
   x. *Castianeira zetes* (Simon)

3. Lycosidae – Wolf Spiders
xi. *Archtosa indica* (Tikadar and Malhotra)
xii. *Evippa mandlaensis* (Gajbe)
xiii. *Lycosa balaranai* (Patel and Reddy)
xiv. *Lycosa thoracica* (Patel and Reddy)
xv. *Pardosa leucopalpis* (Gravely)
xvi. *Pardosa partita* (Simon)
4. Nephilidae
xvii. Nephila pilipes
5. Pholcidae – Daddy Long Leg Spiders
xviii. *Pholcus phalangioides* (Fuesslin)
6. Salticidae – Jumping Spiders
xix. *Marpissa singhi* (Singh and Sadana)
xx. *Menemerus bivittatus* (Dufour)
xxi. Plexippus paykulli
xxii. Plexippus petersi
xxiii. *Rhene decorate* (Tikadar)
xxiv. *Telamonia dimidiata* (simon)
7. Sparassidae – Giant Crab Spiders
xxv. *Heteropoda venatoria* (Linnaeus)
xxvi. *Olios millet* (Pocock)
8. Tetragnathidae
xxvii. *Leucauge decorate* (Blackwall)
xxviii. *Tetragnatha javanus* (Thorell)
9. Thomisidae – Crab Spiders/Flower Spiders
xxix. *Thomisus pooneus* (Tikadar)
xxx. *Tmarus kotigeharus* (Tikadar)
xxxi. *Xysticus bharatae* (Gajbe and Gajbe)

Argiope pulchellla



Plexippus paykulli ***Pholcus phalangioides***

Discussion

Total 31 specimens were collected and identified from the study area which is dominated by ground-dwelling spiders like Araneids, Salticids, and Lycosides in the Vijaysinha Yadav College Campus. All the recorded spider species from the study area during July 2023 and October 2023, belonged to 24 genera and 09 families. *Plexipus pykulli* and *Pholcus phalangiodes* are seemed to be abundant in Peth Vadgaon as they are collected in large numbers. The rich diversity of spiders in this area provides a nice opportunity for research and education. Spiders have a very significant role to play in ecology by being exclusively predatory and thereby maintaining ecological equilibrium. An account of the spider fauna of this region and that of Kolhapur district is not done so far. Hence, work on Spiders in this region has a huge scope.

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'भारतीय स्वातंत्र्य लढ्यातील महाराष्ट्राचे योगदान :एक दृष्टीक्षेप'

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गोषवारा

इ. स. 1757 च्या प्लासीच्या युद्धाने इंग्रजांनी आपल्या साम्राज्याचा पाया भारतात घातला तर 1764 च्या बक्सारच्या युद्धाने तो भक्कम बनला.भारताच्या स्वातंत्र्यलढ्यातील तीन राज्याचे योगदान महत्त्वाचे आहे. त्यामध्ये महाराष्ट्र, बंगाल आणि पंजाब या राज्यांचा समावेश होतो. भारतीय राष्ट्रवादाचा उदय आणि त्यापूर्वीपासूनच वासाहतिक सत्तेला विरोध करण्याची भूमिका महाराष्ट्रात दिसून येते.भारतीय स्वातंत्र्यलढा हे पराक्रमाचे, वैभवाचे व तेजाचे पर्व होते.त्यामध्ये महाराष्ट्राची भूमिका महत्वाची होती.

प्रस्तावना:

भारतीय स्वातंत्र्यलढा हे पराक्रमाचे, वैभवाचे व तेजाचे पर्व होते. भारताच्या स्वातंत्र्यलढ्यातील तीन राज्याचे योगदान महत्त्वाचे आहे. त्यामध्ये महाराष्ट्र, बंगाल आणि पंजाब या राज्यांचा समावेश होतो. भारतीय राष्ट्रवादाचा उदय आणि त्यापूर्वीपासूनच वासाहतिक सत्तेला विरोध करण्याची भूमिका महाराष्ट्रात दिसून येते. त्यामुळे भारताला स्वातंत्र्य मिळण्याच्या प्रत्येक टप्प्यात महाराष्ट्राची भूमिका, नेतृत्व वकार्य महत्वाचे राहिले त्याच्याच अभ्यास याशोधनिबंधात करण्यात आला आहे.

*** ब्रिटीशांची सत्ताप्राप्ती**

इ. स. 1757 च्या प्लासीच्या युद्धाने इंग्रजांनी आपल्या साम्राज्याचा पाया भारतात घातला तर 1764 च्या बक्सारच्या युद्धाने तो भक्कम बनला. इंग्रजांनी भारतात आपले वर्चस्व निर्माण करताना महत्त्वाचे एकेक प्रदेश जिंकून घेतल्याचे दिसून येते. इंग्रजांना हा प्रदेश जिंकून घेताना काही प्रदेश सहजपणे जिंकून घेतले किंवा काहीप्रदेशात इंग्रजांना फारसा संघर्ष करावा लागला नाही उदा.

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बंगालच्या प्रदेश इंग्रजांनी सहजपणे जिंकून घेतला परंतु महाराष्ट्राचा प्रदेश जिंकून घेण्यासाठी इंग्रजांना संघर्ष करावा लागला.

ब्रिटीशांचे धोरण

इंग्रज हे भारताकडे वासाहतिक दृष्टीकोनातून पहात होते. आर्थिक फायदा करूनघेणे हा वासाहतिक सत्तेचा प्रमुख उद्देश होता. इंग्रजांनी जसे प्रशासनिक बदल केले तसा त्यांनी केलेला एक महत्वाचा बदल म्हणजे शिक्षणाचा होता. इ.स. 1835 च्यामेकॉले प्रस्तावाने भारतातील पाश्चात्य शिक्षणाचा पाया घातला गेला. इंग्रजांच्या या शैक्षणिक सुधारणेमुळे एक बुद्धीजीवी वर्ग तयार झाला. महाराष्ट्रात आणि भारतातया मध्यम वर्गीय बुद्धीजीवी वर्गाने स्वातंत्र्य चळवळीचे नेतृत्व केले. राजकीय जागृतीबरोबरच सामाजिक सुधारणेची ही बाजू महत्वाची होती. शिक्षणाच्या सुधारणेमुळे समाजसुधारणेची चळवळगतिमान बनली. म. फुले यांनी शिक्षणाचे महत्व ओळखून बहुजन समाजात शिक्षणाची बीजे रोवून ब्राम्हणेतरांमध्ये जनजागृती करण्याचे मोलाचे कार्य केले. राजकीय जनजागृतीचा विचार करताना याचवेळी महाराष्ट्रात झालेल्या या सामाजिक सुधारणा चळवळी वेगळ्याविचारकरून चालत नाहीत तरत्यांचाहीविचार करावा लागतो.

राष्ट्रवादाच्या विकासाचा पहिला टप्पा (1885- 1905)

भारतातील राष्ट्रवादाचा उदय ही एक वैशिष्ट्यपूर्ण घटना होय. वासाहतिक सत्तेला 19 व्या शतकाच्या पूर्वीपासूनचविरोध होत असल्याचे दिसून येते. त्यामध्ये महाराष्ट्रात बॉम्बे असोशिएशन, पूर्ण सार्वजनिक सभा, बॉम्बे प्रेसिडन्सी असोशिएशन या संघटना कार्य करीत होत्या. भारतीय राष्ट्रीय काँग्रेसची स्थापना आणि महाराष्ट्राचा विचार करताना त्याचे सर्वात महत्वाचे वैशिष्ट्य दिसून येते ते म्हणजे भारतीय राष्ट्रीय काँग्रेसची स्थापना मुंबई येथे 28 डिसेंबर 1885 रोजी झाली. या पहिल्या अधिवेशनाला 72 प्रतिनिधी उपस्थित होते. त्यामधील 18 प्रतिनिधी एकट्या मुंबईतून आले होते. इ. स 1885 पासून भारताला स्वातंत्र्य मिळेपर्यंत जी अधिवेशने झाली त्यामधील14 अधिवेशनेमहाराष्ट्रात झाली.

यापहिल्या टप्प्यात महाराष्ट्रातील गोपाळ कृष्ण गोखले, रानडे, दादाभाई नौरोजी यासारख्या विचारवंतांचे कार्य महत्त्वाचे होते.1885-1905 या काळातील भारतीय स्वातंत्र्य लढयातील मवाळांचे योगदान महत्त्वाचे होते. या काळातील नेतृत्व भारताच्या स्वातंत्र्य चळवळीला दिशा देणारे होते. लोकांमध्ये राजकीय जनजागृती करण्याचे कार्य त्यांनी केले. ब्रिटीशांचे आर्थिक शोषण सांगणारे

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दादाभाई नौरोजी, रानडे मुंबईतीलच होते.त्यामुळे या पहिल्या टप्प्यात महाराष्ट्राची भूमिका महत्वाची दिसूनयेते.

2. जहालयुग

राष्ट्रीय काँग्रेसच्या कार्याचा दुसरा टप्पा म्हणजे जहालवादाचा होता लो. टिळकांनी त्याचे नेतृत्व केले. स्वराज्य, स्वदेशी बहिष्कार आणि राष्ट्रीय शिक्षण या चतुःसुत्रीचा वापर त्यांनी भारताच्या सातंत्र्य चळवळीत केला. बंगालच्या फाळणीच्या विरोधात महाराष्ट्रात ही मोठया प्रमाणात आंदोलन करण्यात आले. होमरुल चळवळीचा ही प्रसार महाराष्ट्रात झाला.

3 गांधीयुग

लोकमान्य टिळकांच्या नंतर स्वातंत्र्य चळवळीचे नेतृत्व म. गांधीजी यांच्याकडे आले. म. गांधी यांच्या नेतृत्वाखाली सर्वसामान्य जनता व्यापक प्रमाणात सहभागी झाली.म. गांधी यांच्या कार्याची सुरवात देखील मुंबईतूनच झाली. म. गांधी यांच्या नेतृत्वाखाली तीन प्रमुख चळवळी झाल्या.

*** असहकाराची चळवळ -**

म. गांधीजींनी सुरु केलेली ही पहिली मोठी चळवळ होती. या चळवळीला जन आंदोलाचे स्वरूप प्राप्त झाले. या असहकार चळवळीच्या अंतर्गत न्यायालये,परकीयवस्तूवर बहिष्कार ,मध्यपान निषेध असे उपक्रम राबविण्यात आले. मुळशी सत्याग्रह व नागपूरचा झेंडा सत्याग्रह हे असहकार चळवळीतून उद्भवलेले लढे होते.

*** सविनय कायदेभंगाची चळवळ**

म. गांधीजींच्या नेतृत्वाखालील दुसरी महत्त्वाची चळवळ म्हणजे सविनय कायदेभंगाची चळवळ होय. मीठ व तत्सम कायद्याचा भंग करणे, शेतसारा व सरकारला कर न देणे, याबरोबरच जेथे समुद्रकिनारा नाही अशा ठिकाणी जंगल सत्याग्रह करण्यात आले. शिरोडा,वडाळा, पुणे जिल्हयातील सत्याग्रह महत्वाचे होते. महाराष्ट्रात संगमनेर, अकोला, नाशिक, खानदेश या भागात जंगल सत्याग्रह करण्यात आले. सोलापुरातील उठाव वैशिष्ट्यपूर्ण होता. बिळाशी, सातारा जिल्हात अनेक ठिकाणी जंगल सत्याग्रह करण्यात आले. मध्य प्रांत, व-हाड प्रांतातही कायदेभंगाची चळवळ चालविण्यात आली. सविनय कायदेभंगाच्या चळवळीतील सोलापूरमधील उठावही प्रसिध्द गती देणारी

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घटना होती. यामध्ये संप, हरताळ, मिरवणूका यांचा समावेश होता. पोलिसांनी बेछूट गाळीबार केल्यामूळे सोलापूर मध्ये मार्शल लॉ लॉगू करण्यात आला. नगरपालिकेच्या इमारतीवर तिरंगा ध्वज फडकविण्यात आला.

*** छोडो भारत चळवळ**

छोडो भारत हे भारताच्या स्वातंत्र्य लढातील शेवटचे मोठे आंदोलन होते. याचळवळीतही महाराष्ट्राची भूमिका महत्त्वाची राहिली. मुंबई हे 1942 च्या चलेजाव चळवळीचे प्रमुख केंद्र होते. मुंबई येथे 7 ऑगस्ट 1942 रोजी छोडो भारतचा ठराव कॉग्रेसने स्विकारला. 'करेंगे या मरेंगे' ही घोषणा देण्यात आली. पुणे शहरातही ही चळवळ करण्यात आली. राष्ट्रसंत तुकडोजी महाराजानी यावली येथे आंदोलन केले. कोल्हापूर, सोलापूर, औरंगाबाद इत्यादी ठिकाणीही या चळवळीचचा प्रसार झाला.

*** प्रतिसरकारचे कार्य-**

प्रतिसरकार हे महाराष्ट्राच्या स्वातंत्र्य चळवळीतील एक महत्वपूर्णवैशिष्टय मानली जाते. प्रतिसरकार मध्ये ग्रामीण जनतेचा सहभाग महत्वाचा होता. ब्रिटीशाचे अन्याय व दडपशाही व आर्थिक शोषणातून मुक्तता करणे हे प्रमुख उदिष्टय होते. 600 गावात प्रतिसरकार होते. त्याला शेतकरी कुटुंबाची पार्श्वमूमी होती. क्रांतीसिंह नाना पाटील किसनवीर, जी.डी.लाड इ. प्रतिसरकार मधील प्रमुख नेतृत्व होते. भुमिगत कार्याबरोबरच समाजसुधारनेचे कार्य ही प्रतिकसरकारने केले.

स्त्रियांचाही सहभाग त्यामध्ये उल्लेखनिय होता. लिलाताई पाटील, नागनाथआण्णा नायकवडी यांच्या मातोश्री लक्ष्मीबाई बापूसाहेब लाड यांच्या पत्नी विजयाबाई यांसारख्या अंसख्या स्त्रिया सहभागी होत्या.

4. * क्रांतिकारकांचे कार्य -

भारताच्या स्वातंत्र्यलढ्यातील क्रांतिकारक चळवळीमध्ये महाराष्ट्र अग्रेसर होता. अर्ज आणि विनंत्या या मार्गाने हे सरकार जागे होत नाही. त्यामुळे त्यांना क्रांतिकारक मार्ग महत्वाचा वाटत होता. मातृभूमीच्या संरक्षणासाठी, स्वातंत्र्यासाठी दहशतवादी क्रांतिकारक मार्ग त्यांनी वापरला. त्यांना समाजात आर्थिक सामाजिक क्रांती करायची होती. महाराष्ट्रातील क्रांतिकारकांचा विचार करता पहिले नाव उमाजी नाईक यांचे येते. त्यांनी इंग्रजांच्या विरोधात उठाव केला. साम्राज्यवादी शक्तीला तोंड

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देण्याचे कार्य त्यांनी केले. वासुदेव बळवंत फडके यांनी रामोशी सारख्या जमातीला हाताशी धरून आंदोलन केले. वि. दा. सावरकरांनी इ.स.1900 मध्ये 'मित्रमेळा' नावाचे संघटन स्थापन केले. इ. स.1904 मध्ये त्याचे रूपांतर अभिनव भारत या संघटनेत करण्यात आले. महाराष्ट्रातील सोलापूर,नाशिक, पुणे इ. ठिकाणी त्याच्या शाखा सुरु करण्यात आल्या.

*** वृत्तपत्रांची कामगिरी**

महाराष्ट्रातील या कालखंडातील वृत्तपत्रांची कामगिरी उल्लेखनिय होती.दर्पण, इंदुप्रकाश, केसरी, मराठा, मुकनायक, बहिष्कृत भारत यासारखे अनेक वृत्तपत्रे महाराष्ट्रात होती. ही वृत्तपत्रे राष्ट्रीय विचारांने प्ररित होती. समाजातील अंधश्रध्दा, अस्पृष्यता, जातीयता , चुकीच्या चालीरीती व परंपरा दूर करण्यासाठी शिक्षण प्रसाराचे ही महत्यची कार्य या काळातील वृत्तपत्रांनी केले. या काळात 30 पेक्षा जास्त वृत्तपत्रे कार्यरत होती. राजकीय जागृती बरोबच समाज सुधारणेचे उल्लेखनीय कार्य वृत्तपत्रांनी केले.समाजसुधारणेचा विचार करता महात्मा फुले, छ.शाहू महाराज, डॉ. बाबासाहेब आंबेडकर यांचे नेतृत्व महाराष्ट्रातून पूढे आले.

* महत्वाची अधिवेशने

भारतीय राष्ट्रीय कॉग्रेसची महाराष्ट्रात 14 अधिवेशने झाली. त्यामधील 3 प्रमुख अधिवेशने महत्वाची आहेत. मुंबई येथे पहिले अधिवेशन भरले. याशिवाय फैजपूर येथे ग्रामीण भागातील पहिले अधिवेशन भरले.याशिवाय नागपूर येथील आधिवेशन महत्वपूर्ण ठरले.

मुंबई येथील नाविकानी 1946 मध्ये केलेला उठाव देखिल महत्वाचा होता.मुंबईतील लोकांचा या उठावाला पाठिंबा होता.

उपसंहार -

अशा प्रकारे भारतीय स्वातंत्र्य लढात महाराष्ट्राची भूमिका महत्वाची असल्याचे दिसून येते. यामध्ये स्वातंत्र्यप्राप्ती आणि समाजसुधारणा अशा दुहेरी बाजू दिसून येतात. आधुनिक महाराष्ट्रात मवाळयुग, जहालयुग, गांधीयुग आणि क्रांतीकारक गट अशा प्रकारे स्वातंत्र्यांची चळवळ विकसीत होत गेली.

निष्कर्ष :

1) राष्ट्रनिर्मितीचे ओजस्वी कार्य हे महाराष्ट्र भूमीतून होत राहिले.

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2) भारतीय स्वातंत्र्य लढयाच्या प्रत्येक टप्प्यात महाराष्ट्रातल्या नेतृत्वाने महत्वाचे योगदान दिले.

3) इ.स.1885 ते 1905 या काळातील नेतृत्व भारतीय स्वातंत्र्य चळवळीला दिशा देणारे होते. त्यामध्ये गोपाळकृष्ण गोखले, महादेव गोविंद रानडे, दादाभाई नौरोजी या सारखे नेतृत्व महाराष्ट्रातून पूढे आले.

4) मुंबई हे भारतीय स्वातत्र्य चळवळीचे महत्वाचे केंद्र राहिले. ब्रिटीशाना वैचारिक विरोध मुंबईमधून होऊ लागला.

5) ब्रिटीशांच्या विरोधी भूमिका घेणे तो प्रयोग महाराष्ट्रात झाल्याचे दिसून येते.

6) क्रांतीकारक चळवळीतही महाराष्ट्राचे योगदान महत्वपूर्ण राहीले.

7) उमाजी नाईक पासून अच्च्युतराव पटवर्धन यांच्यापर्यंत क्रांतीकारक चळवळीने महत्वाचे योगदान दिल्याचे दिसून येते.

8) महाराष्ट्रातील वृत्तपत्रांची भूमिका महत्वपूर्ण राहिली. राजकीय जागृती बरोबरच समाजसुधारणेची भूमिका महत्वाची असल्याचे दिसून येते.

9) साता-याच्या प्रतिसरकारची प्रेरणा भारताच्या स्वातत्र्य चळवळीला मिळाल्याचे दिसून येते.

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"1857 च्या उठावातील छत्रपती चिमासाहेब उर्फ शाहू महाराजांची भूमिका"

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गोषवारा

1857 च्या उठावहा भारतीय इतिहासात स्वातंत्र्ययुद्ध, पहिला भारतीय स्वातंत्र्यलढा आणि शिपायाचे बंड या नावाने ओळखला जातो. हा उठाव उत्तर भारतातील ब्रिटिश सत्तेच्या अन्याय धोरणाविरोधात केला होता.31 मे 1857 ही उठावाची पूर्वनियोजित तारीख होती. मात्र त्याआधीच 29 मार्च 1857 लाबराकपूरच्या छावणीतील उठावाची तोफ डागली गेली. याउठावाचे लोन हे उत्तर भारतानंतर दक्षिण भारतात पसरले. त्यामध्ये कोल्हापूर संस्थानात येऊन पोहोचले होते. यातूनच 1844 मध्ये कोल्हापूर विभागातील पन्हाळा, विशाळगड, सामानगड व भुदरगड या ठिकाणच्या गडकऱ्यांनी एकाच वेळी ब्रिटिशाविरुद्ध बंडाचे निशाण उभारले. पण त्यांची ताकद अपुरे पडल्याने ब्रिटिशांनी ते बंड मोडून काढले. या घटनेचा परिणाम चिमासाहेबांवर झाला, त्याच्यामनात ब्रिटीशा विरोधात असंतोष भडकू लागला. त्यांनी विरोध उघड बोलून दाखवला. कोल्हापुरातील या उठावाचे नेतृत्व चिमासाहेब महाराजांनी स्वीकारले. पेशवा नानासाहेबांचा दूत चिमासाहेबांना भेटला. त्यानंतर कोल्हापूरच्या देशी पायदळाच्या 27 क्रमांकाच्या तुकडीने31 जुलै 1857 रोजी छत्रपती चिमासाहेबांचा सहकारी रामजी शिरसाटच्या नेतृत्वाखाली कोल्हापुरात बंडाचे निशाण उभारले. इंग्रज अधिकाऱ्यांच्या निवासस्थानावर अचानक हल्ले करून त्यांना ताब्यात घेणे किंवा ठार मारणे ही उठावाल्यांची मूळ योजना होती. पण कोल्हापुरातील उठाव एकाने फितूरी केल्याने थोडे अपयशी झाला. फिरंगोजीशिंदे व त्यांच्या सहकाऱ्यांना गोळ्या घातल्या या उठावाच्या पाठीमागे चिमासाहेब महाराज यांना जबाबदार धरले. त्यांना कोल्हापुरात ठेवणे धोका आहे, म्हणून समुद्र मार्गे लांब दूर कराची या ठिकाणी नजर कैदेत ठेवले. कराची तुरुंगातील अकरा वर्षाची कैद भोगल्यानंतर छत्रपती चिमासाहेब महाराजांचा 15 मे 1869 रोजी कराचीतदुर्दैवी अंत झाला.1857 च्या उठावात अनेकांची नावे प्रामुख्याने घेतली जातात. पण याच स्वातंत्र्य संग्रामात छ. शिवाजी महाराजांचा वारसा लाभलेल्या कर्तबगार घराण्यात एक क्रांतिवीर होऊन गेला.1857 च्या लढ्याला कोल्हापूरचे नेतृत्व करणारे, इंग्रजांच्या पुढे न झुकता,

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माफीन मागता छत्रपती असूनही ब्रिटिशांच्या कैदेतमरण पसंत करणारे, छत्रपती चिमासाहेब हे छत्रपती घराण्यातील पहिले स्वातंत्र्यवीर होऊन गेले.

प्रस्तावना

1857 चा उठाव हा भारतीय इतिहासात स्वातंत्र्य युद्ध, पहिला भारतीय स्वातंत्र्यलढा आणि शिपायांचे बंड या नावाने ओळखला जातो. हा उठाव उत्तर भारतात ब्रिटिश सत्तेच्या अन्यायी धोरणाविरोधात केला होता. 31 मे 1857 ही उठावाची पूर्वनियोजित तारीख होती मात्र त्याआधीच 29 मार्च 1857 रोजी बराकपूर येथील छावणीत मंगल पांडे या शिपायाने ब्रिटिश अधिकारी मेजर हयूसन यांच्या वर गोळी झाडून प्रथम उठावाची तोफ डागली. परिणामी नियोजित तारखेपूर्वीच क्रांती उद्याच्या उठावाची ठिणगी पडली. मिरत मधील छावणीतील सैनिकांनी 10 मे 1857 रोजी उठाव केला. हे क्रांतिकारी सैन्य 11 मे 1857 रोजी मिरत होऊन 30 मैल अंतरावर असलेल्या दिल्ली या ठिकाणी पोचले उठावात दिल्ली हे शहर क्रांतीकारकाचे मुख्य केंद्र बनले . क्रांतिकारकांनी दिल्लीचा बादशाह म्हणून बहादुर शहा दुसरा यास घोषित करून त्याने दिल्ली आपल्या ताब्यात घेतली. या उठावाचे लोण उत्तर भारतात प्रचंड प्रमाणात पसरले होते मात्र त्या मानाने या उठावापासून दक्षिण भारत ब-यापैकी वंचित राहिला देशातील अनेक संस्थानिकांनी आपली गादी वाचवण्यासाठी आणि राज्यकारभाराचे स्थान अबाधित ठेवण्यासाठी ब्रिटिश कंपनी सरकारला विरोध न करता मदत केली. पण पेशवा नानासाहेब, सेनापती तात्या टोपे, झाशीची राणी लक्ष्मीबाई यासारखे क्रांतिकारी शूर मंडळी उठावात आघाडीवर होती. या उठावाचे लोण कोल्हापूर राज्यात ही येऊन पोहोचले होते सत्तापिपासू ब्रिटिश सरकारच्या विरोधात कोल्हापुरी जनता ही संतप्त होऊन उठावात सामील झाली. या उठाववाल्यांना छत्रपती चिमासाहेब महाराज यांच्या रूपाने लाभलेल्या नेतृत्व, जन्म, बालपण, उठावातील त्यांची भूमिका, कोल्हापुरातील उठाव विश्वासू सहका-याची साथ27 व्या नेटिव्ह इन्फंट्री पलटणीची भूमिका उठावाचा अंत इत्यादी घटकांचा सविस्तर आढावा या शोधनिबंधात घेण्यात आला आहे.

जन्म व बालपण

छत्रपती चीमासाहेब उर्फ शाहू महाराज यांचा जन्म 8 जानेवारी 1831 रोजी छत्रपती शहाजी उर्फ बुवासाहेब महाराज आणि नर्मदाबाई राणीसाहेब या मातापित्यांच्या पोटी झाला.[1] छत्रपती चिमासाहेब हे लहान पाच महिन्याचे असतानाच त्यांची आई नर्मदाबाई राणीसाहेब मरण पावल्या.

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चिमा साहेब पोरके झाले. लहानपणी छत्रपती चिमासाहेबांचा सांभाळ करण्यासाठी भाऊसाहेब चव्हाण, खंडेराव बाबासाहेब निंबाळकर, बापूसाहेब हिम्मतबहादूर, ज्योतीराम घाडगे, आप्पासाहेब घाडगे आणि भीमबहादूर अशा कर्तबगार मंडळींची नेमणूक केली. 1840 मध्ये छत्रपती चीमासाहेबांची मुंज करण्यात आली. त्यानंतर पॉलिटिकल एजंटाकडून त्यांच्या शिक्षणाची व्यवस्था करावी अशी सुचविण्यात आले होते. परंतु कारभा-यांनी त्याच्याकडे दुर्लक्ष केल्यामुळे ते शिक्षणात मागे राहिले. मात्र काही दिवसानंतर त्यांच्या शिक्षणासाठी व्याकरणकार दादोजी पांडुरंग यांची नियुक्ती केली होती. त्यानंतर इंग्रजी व इतर विषय शिकवण्यासाठी एलिफंटन्स कॉलेजमधील केशव नरसिंह देशपांडे या पदवीधराची निवड करण्यात आली. पुढे चिमा साहेबांचा 26 एप्रिल 1847 रोजी नरसिंगराव शिंदे नेसरीकर यांच्या मुलीशी विवाह झाला

गडक-यांच्या उठावाचा चिमा साहेबावर झालेला परिणाम

ब्रिटिश इलाख्यातील महसूल व्यवस्थेप्रमाणे दाजी कृष्ण पंडीताने मामलेदारांची नेमणूक केली. सरदार सरंजामदाराच्या जमिनी मामलेदारांच्या अधिकार कक्षेत आणल्यामुळे येथे सुव्यवस्था प्रस्थापित झाली. तथापि या संदर्भात हितसंबंध असलेले सरदार सरंजामदार दुखावले गेले. यातूनच 1844 मध्ये कोल्हापूर भागातील पन्हाळा, विशाळगड, सामानगड आणि भुदरगड या ठिकाणीच्या गडकऱ्यांनी एकाच वेळी ब्रिटिशाविरुद्ध बंडाचे निशाण उभारले.[2] पण त्यांची ताकद अपुरी पडल्याने ब्रिटिशांनी ते बंड मोडून काढले. या घटनेचा परिणाम छत्रपती चिमासाहेबांवर झाला त्यांच्या मनात ब्रिटिशाविरुद्ध असंतोष भडकू लागला. बाहेरच्या परदेशी लोकांनी येथे येऊन आपल्या राज्यकारभारावर वचक ठेवणे आपणास आवडत नाही असे ते उघड उघड बोलू लागले. छत्रपती चिमासाहेबांना मर्दानी खेळ खेळणे आणि शिकारीची आवड होती. या छंदातून त्यांनी करवीर राज्यात फिरत असताना लोकांची पारख करून लोकसंग्रह केला. यामध्ये फिरंगोजी शिंदे, रामसिंग परदेशी, रामजी शिरसाठ, हंबीरराव व दौलतराव मोहिते असे अनेक विश्वासू सहकार्यांना सोबत घेऊन छत्रपती चिमासाहेब महाराजांनी उठावाची जय्यत तयारी केली.

कोल्हापुरातील उठाव

1857 व्या उठावास उत्तर भारतात प्रथम सुरुवात झाली. या उठावाची व्याप्ती वाढविण्यासाठी पेशवा नानासाहेबांनी दक्षिणेकडील राज्यांशी संधान बांधण्याचा प्रयत्न केला. त्यामध्ये विशेषता कोल्हापूरकरांना उठावातील सहभागी करून घेण्यासाठी पेशवा नानासाहेबांनी आपला दूथ म्हणून

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ज्योतिराव उर्फ भाऊसाहेब घाटगे यांना छत्रपती बाबासाहेब महाराज यांच्याकडे पाठवले, पण बाबासाहेब महाराजांची उर्थी क्रांतिकारी उठावाशी जुळणारी नसावी अथवा उठावात सहभाग घेतलास आपले राज्य खालसा केले जाईल कि काय याची त्यांनी धास्ती वाटत असावी. शिवाय त्यांच्या हाती राज्यकारभाराचे अधिकार नव्हते अशा परिस्थितीत उठावात सहभागी होणे त्यांना अनुकूल वाटत नसावे. त्यामुळे त्यांनी उठावा संदर्भात पेशवा नानासाहेबांच्या आव्हानाला प्रतिसाद दिला नाही [4] छत्रपती बाबासाहेबांना जे जमले नाही ते त्यांचा भाऊ चीमासाहेब करून दाखवले. कोल्हापुरातील या उठावाचे नेतृत्व चीमासाहेबांनी स्वीकारले. जून 1857 मध्ये पेशवा नानासाहेबांचा दूत भाऊसाहेब घाटगे यांनी चिमासाहेब महाराजांची भेट घेऊन त्यांना चांदीची मूठ व मौल्यवान पाते असलेली तलवार भेट दिली.[5] या घटनेने प्रेरित होऊन चिमासाहेबांनी आपल्या सरकारच्या मदतीने छत्रपतीचे रेड रिसाला लष्कर आणि इंग्रज सरकारची कोल्हापुरातील 27 वी पलटण या फौजांमध्ये फितुरी घडवून आणले.

27 व्या नेटिव्ह इन्फंन्ट्री पलटणची भूमिका

कोल्हापूरच्या देशी पायदळाच्या 27 क्रमांकाच्या तुकडीने 31 जुलै 1857 रोजी छत्रपती चिमासाहेबांचा सहकारी रामजी शिरसाठ यांच्या नेतृत्वाखाली कोल्हापुरात बंडाचे निशाण उभारले इंग्रज अधिकारांच्या निवासस्थानावर अचानक हल्ले करून त्यांना ताब्यात घेणे किंवा त्यांना ठार मारणे ही उठावाची मूळ योजना होती.[6] ही योजना हिंदू हवालदारांच्या फितुरीने इंग्रजांना समजली त्यावेळी ब्रिटिशांनी तात्काळ बेळगाव, रत्नागिरी या ठिकाणाहून आपल्या फौजा बोलावून घेतल्या. त्यांनी रामजी शिरसाठ आणि त्यांच्या काही साथीदारांना पकडून फाशी दिली, तर काहींना गोळ्या घातल्या. याप्रकरणी रामजी शिरसाटला छत्रपती चिमासाहेबांची फूस होती. यांची शहानिशा करून इंग्रजांनी चिमासाहेब महाराजांच्या राजवाड्यात नजर कैदेत ठेवले चिमासाहेबांच्या काही सहकार्यांनाही ब्रिटिशांनी अटक केली. त्यासाथीदारांनी चिमासाहेब महाराज ब्रिटिशांच्या विरोधी उठावात सामील आहेत अशी साक्ष द्यावी म्हणून त्यांच्यावर जुलम जबरदस्ती अत्याचार करण्यात आले. पण कोणताही स्वामीनिष्ठ मर्द मावळा छत्रपती चिमासाहेबांच्या विरोधात साक्षी द्यायला पुढे आला नाही. शेवटी ब्रिटिशांनी त्यानाही फासावर चढवले. त्यानंतर छत्रपती चिमासाहेबांचा एक विश्वासू साथीदार फिरंगोजी शिंदे यांनी आपल्या साहेबाला नजरकैदेतून सोडवण्यासाठी 5 डिसेंबर 1857 रोजी पाचगाव आणि गिरगाव मधील आपल्या निवडक साथीदारांना घेऊन कोल्हापुरात प्रवेश केला. राजवाड्याला पहारा देण्यासाठी असलेल्या ब्रिटिश सैनिकांना कापून काढत फिरंगोजी शिंदे राजवाड्यात शिरले आणि

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छत्रपती चिमासाहेबांना हाका मारू लागले. तेवढ्यात लपून बसलेल्या एका ब्रिटिश सैनिकाने फिरंगोजी शिंदे यांच्यावर गोळ्या झाडल्या फिरंगोजी शिंदे धारातीर्थ पडले या कालावधीत ब्रिटिश अधिकारी कर्नल जेकब आपली फौज घेऊन राजवाड्यावर पोहोचला, जेकबने शिंदेच्या सर्व साथीदारावर गोळ्या झाडल्या रक्ताच्या थारोळयात सर्वत्र पडलेल्या स्वातंत्र्य सैनिकांना तुडवत कर्नल जेकब राजवाड्यात गेला चिमासाहेब राजवाडातच आहेत हे पाहून त्याने सुटकेचा निश्वास सोडला. या सर्व घटनेला छत्रपती चिमासाहेबाला जबाबदार धरले छत्रपती चिमासाहेब महाराजांना कोल्हापुरात ठेवणे हे आपल्यासाठी घातक असल्याची ब्रिटिशांना जाणीव झाली. ब्रिटिशांनी 1858 च्या मार्च महिन्यामध्ये त्यांना कोल्हापूरातून हलवून रत्नागिरी येथून बोटीने समुद्र मार्गे कोल्हापूर पासून शेकडो मैल दूर असलेल्या कराची या ठिकाणी नजर कैदेत ठेवले. कराची तुरुंगातील अकरा वर्षाची कैद भोगल्यानंतर छत्रपती चिमासाहेब महाराजांचा 15 मे 1869 रोजी कराची मध्ये दुर्देवी अंत झाला.

समारोप

1857 चा उठाव म्हटले की आपल्यासमोर मंगल पांडे, बहादूरशाह जफर, पेशवा नानासाहेब, तात्या टोपे आणि झाशीची राणी लक्ष्मीबाई इत्यादींची नावे प्रामुख्याने येतात पण यात स्वातंत्र्य संग्रामात छत्रपती शिवाजी महाराजांचा वारसा लाभलेल्या कर्तबदार घराण्यात एक क्रांतिवीर होऊन गेला. 1857 च्या लढ्यात कोल्हापूरचे नेतृत्व करणारे इंग्रजांच्या पुढे न झूकता माफी न मागता छत्रपती असूनही ब्रिटिशांच्या कैदेत मरण पसंत करणारे हे छत्रपती चीमासाहेब हे छत्रपती घराण्यातील पहिले स्वातंत्र्यवीर होऊन गेले.

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USER STUDY OF HEALTH SCIENCE LIBRARIES IN WESTERN MAHARASHTRA: WITH SPECIAL REFERENCE TO AYRVEDIC MEDICAL COLLEGE LIBRARIES.

[1]Mr. Raghunath R.Chavan [2]Dr. Kallyan N. Kumbhar

Abstract

The present research paper is confined to study the users of Ayurvedic Medical College libraries in Western Maharashtra viz Doctors, Teachers, and medical students as the users of the library. The efforts are made to study their users from the view point of their satisfaction about their requirements from the library.

Key words: User, User Study, Medical Libraries,

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Introduction

In the library there are important factors responsible for working of the library i.e. user, library collection and librarian. Librarian is the mediator and playing an important role and bringing users and its reading material together. Librarians develop the collection as per the desired goal of organization / institution, whereas user requirement (needs) to be given proper attention while fulfilling the goal of the institution.

General, in the context of the library the term 'Reader' is called as "Who reads the book is reader", whereas the users defined as "Who makes the use of large verity of documents of the library." In this context the term 'Users' is fully employed to represent the seekers of information. Users are continuously imparting the information as per requirement.

Therefore, it needed to understand he users of the library systematically. For the purpose of the study the term users and reader taken in the context of use of library and the meaning of both are the same.

Concept of User

The term 'User' in the context of information chain may be at the end. The generator of information, who comes in the beginning of the chain, may also be an 'End User' of information. In the context of database, he is the 'Searcher', a user may be a 'Researcher' he may be a middle man or liaison officer in the dissemination of information.

Definition of User

The definition of information user is as under given by the information security Glossary.

"An Information User is the person responsible for viewing / amending / updating the content of the information assets. This can be any user of the information in the inventory created by the Information Owner."[1]

USER STUDY

For a long time, the users even in a scientific library were considered a neglected component by librarians. But today the situation has changed. The librarian, have recognized the significance of users as the most vital component in the communication cycle. In fact modern libraries are becoming more and more user oriented. The present trend towards national information system has made the need for user studies more significant.

In India however, It is a new phenomenon. The present trend to the Indian universities and colleges is that the number of students, researchers and teachers are increasing year after year. But the resource allocation to the university and college libraries is not commensurate with increased rate of users and cost escalation of documents especially scientific documents. The aforesaid problems are forcing librarians to think more and more in terms of need based acquisition of documents and providing appropriate information services. Considering this point in mind a user study is conducted among the users in the Ayurvedic Medical College Libraries In western Maharashtra.

Objective of the study

Following objectives can be categorized as.

1. To know what are the information requirements of the user.
2. What need to be done do make effective use of the library resources services.
3. To know the adequacy of library collection for the needs of users.

Scope of the study.

Research is an endless process. The scope of the present study is confined to study the users of Ayurvedic Medical College libraries in Western Maharashtra viz Doctors, Teachers, and medical students as the users of the library. The efforts are made to study their users from the view point of their satisfaction, about their requirements from the library. The area of the study is cover to five district in Maharashtra state it's called Western Maharashtra these are Kolhapur, Sangli, Solapur, Satara and Pune. Its area in kilometer near about 400. The scope of this study is limited to the health science faculty and students of Ayurvedic college libraries in Western Maharashtra.

Selection of the sample

The user population in this study consists of students and teachers. A sample consisting of fifteen (15) Ayurvedic Medical College Libraries in Western Maharashtra and 40 (forty) members of each college has been selected from user population of 40 X15 = 600 members. The sample group consists of 1st year B.A.M.S., 2ND B.A.M.S., 3RD B.A.M.S., Internee students and Teachers.

Collection of Data

Questionnaire method was mainly adopted for the primary data collection. Interview method was used among the scholars on a selected basic to corroborate the findings.

An improved questionnaire has been prepared keeping in view the study in mind. The 40 X 15 = 600 questionnaire was distributed amongst the Ayurvedic Medical College Library users. While collecting the questionnaires and at the time of their visit to the library the concerned users were interviewed.

Additional information was collected by talking to the users and members of the staff. Certain records of the library were consulted and annual reports of the Ayurvedic Medical College libraries in western Maharashtra were also studied.

Analysis of data

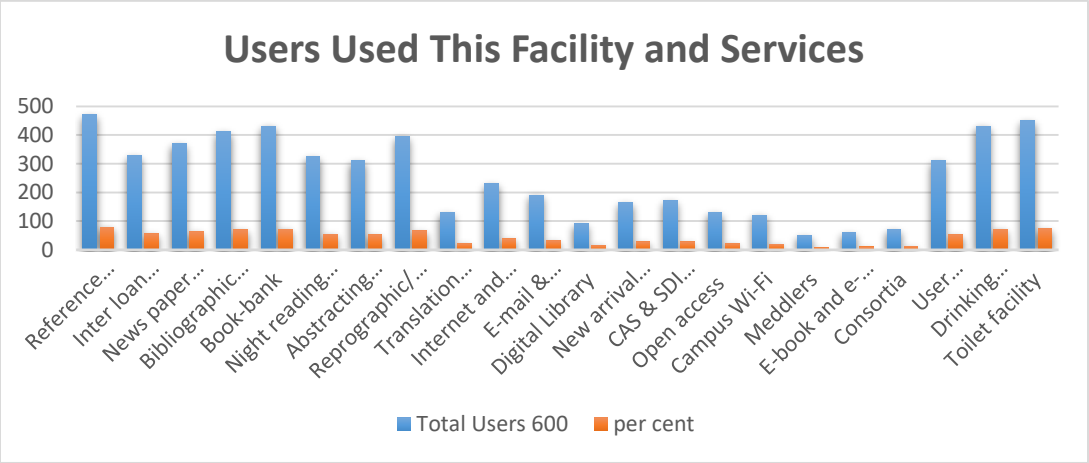
The data has been noted from duly filled up questionnaire the analysis of the data indicates the following trends in the proposed user study. About 50 X 15 = 750 questionnaire was distributed. Out of which 600 questionnaires were received back. The frequency is 80%, whereas the response was very good.

Table No. 1.

The table shows the data of users used facility and services available in Health Science Libraries in western Maharashtra, special reference to Ayurvedic College Libraries.

Sr. No.	Services	Total Users 600	per cent
1	Reference services	472	79
2	Inter loan services	328	55
3	Newspaper clipping	370	62
4	Bibliographic services	412	69
5	Book-bank	430	72
6	Night reading room facility	325	54
7	Abstracting and Indexing	310	52
8	Reprographic/Xerox	395	66
9	Translation services	130	22
10	Internet and Fax ser.	230	38
11	E-mail & Scanning ser.	190	32
12	Digital Library	90	15
13	New arrival display on screen	165	28
14	CAS & SDI services	170	28
15	Open access	130	22
16	Campus Wi-Fi	120	20
17	Meddlers	50	8
18	E-book and e-journals	60	10
19	Consortia	70	12
20	User orientation program	310	52
21	Drinking water facility	430	72
22	Toilet facility	450	75

The Bar graph shows in Health Science Library users used facility and services.



CONCLUSIONS,

The study reveals that the many of the users are not able to use the library effectively because they do not know what exactly to be expecting from the library. They feel frustrated in their use of the library due to certain shortcomings in the library services rendered. Therefore it is necessary that the users must be communicated to the librarian from time to time their interests and their library needs. It must be noted without fail that the well-equipped catalogues both dictionary and classified of the library certainly help to the users to search their reading materials by them in a very short time.

The present study shows that the readers are satisfied to some extent for general information needs. But not fully satisfied for nascent information appearing through Reprographic services (Xerox) and non – print materials as well as computerized services like Network, Online, E-mail, E-journals, Down load facilities, MEDLINE, and MEDICUS which are not available in the library. This collection should be developed in future to improve with the latest developments in information media and information technologies. The computerized library services may be also introduced by installing a computer system in the library.

The question may arise that whether the library is in a position to face challenges presented by the changing conditions and the expectations of the users from the Ayurvedic Medical College libraries. In spite of some of these shortcomings it is observed in the present study that the library is working efficiently and effectively in order to satisfy the user's needs.

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"स्वतंत्रता संग्राम और हिंदी कविता"

डॉ. सहदेव वर्षाराणी निवृत्तीराव

श्री विजयसिंह यादव महाविद्यालय, पेठवडगाव, ता. हातकणंगले, जि. कोल्हापुर

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गोषवारा

भारत के स्वतंत्रता संग्राम में हिन्दी कविता का बेहद महत्वपूर्ण स्थान रहा है| हिन्दी कविता ने देश की आम जनता को स्वतंत्रता संग्राम का हिस्सा बनने हेतु प्रेरित किया| भारतेंदु हरिश्चंद्र, महावीर प्रसाद द्विवेदी, मैथिलीशरण गुप्त, श्रीधर पाठक, माखनलाल चतुर्वेदी, बालकृष्ण शर्मा नवीन, सुभद्राकुमारी चौहान आदि कवियोंने अपनी तलवार रूपी कलम चलाकर देश के लोगों के मन में राष्ट्रप्रेम की भावना जागृत की| यह परंपरा भारतेंदु हरिश्चन्द्र से शुरू होकर आगे हिन्दी कविता में प्रभावी रूप से प्रवाहित हुई दिखाई देती है| इन कवियों ने स्वतंत्रता आन्दोलन को अपनी कविता का विषय बनाया| साथ ही राष्ट्रीयता की भावना को बढाकर युगीन समस्याओं के प्रति लोगों को सजग किया| स्वतंत्रता का मूल अर्थ भयमुक्त होना ही हो सकता है| जब तक मन भय मुक्त न हो स्वतंत्रता से साक्षात्कार हो नही सकता| स्वतंत्रता का दायरा बहुत बड़ा, व्यापक और विविध आयामी है क्योंकि समाजरचना के सम्पूर्ण आदर्श इसमें वैयक्तिक स्वतंत्रता के रूप में समाहित होते है| इस बात को स्वीकारते हुए हिन्दी कवियोंने हिन्दी कविता का विषय स्वतंत्रता को बनाया है|

स्वतंत्रता आंदोलन भारतीय इतिहास का वह युग है जो पीड़ा, कड़वाहट, आत्मसम्मान, शौर्य, गौरव तथा सबसे अधिक शहीदों के लहू की समिधा है| स्वतंत्रता के इस महायज्ञ में समाज के प्रत्येक वर्ग ने अपने-अपने तरीके से बलिदान दिए| इस स्वतंत्रता के युग में हिंदी कवियों ने भी अपना मौलिक योगदान दिया है| अंग्रेजों को भगाने में इन साहित्यकारों ने अपनी भूमिका बखूबी निभाई है| क्रांतिकारियों से लेकर देश के आम लोगों तक के अंदर लेखकों, कवियों ने अपने शब्दों से जोश भरा| इन हिंदी कवियों ने अपनी कविता से लोगों में देश प्रेम की ऐसी भावना जगाई की लोग घरों से बाहर निकल आए और क्रांतिकारी आंदोलन का हिस्सा बने| भारत में स्वाधीनता का आंदोलन का इतिहास उतना ही पुराना है जितना की हमारी परतंत्रता का इतिहास| यह देश 1000 वर्ष से भी अधिक समय तक गुलाम रहा परंतु इसका सांस्कृतिक स्वरूप बना रहा| भारत की राष्ट्रीयता का आधार राजनीतिक एकता ना होकर सांस्कृतिक एकता रही है|

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भारतेंदु हरिश्चंद्र ने जिस आधुनिक युग का प्रारंभ किया उसकी जड़ें स्वाधीनता आंदोलन में ही थी| भारतेंदु और भारतेंदु मंडल के साहित्यकारों ने युवा चेतना को गद्य और पद्य दोनों में अभिव्यक्ति दी| इसके साथ ही इन रचनाकारों ने स्वतंत्रता आंदोलन की प्रशंसा करते हुए भारत के स्वर्णिम अतीत में लोगों की आस्था जगाने का प्रयास किया| वहीं दूसरी ओर उन्होंने अंग्रेजों की शोषणकारी नीतियों का खुलकर विरोध किया| भारतेंदु हरिश्चंद्र ने स्वतंत्रता आंदोलन में महत्वपूर्ण भूमिका निभाई| अंग्रेजों द्वारा भारतीय जनता पर जुल्म का विरोध किया| उन्हें इस बात का मलाल था कि, अंग्रेज यहां से सारी संपत्ति लूट कर विदेश ले जा रहे थे; इस लूटपाट और भारत की बदहाली पर उन्होंने काफी लिखा 'अंधेर नगरी चौपट राजा' नामक काव्य के माध्यम से तत्कालीन राजाओं की निरंकुशता अभिव्यक्त कर दी और उनकी मूर्खता का सटीक वर्णन किया है| अपने युग की वस्तुस्थिति को समझते हुए, राष्ट्रीय जागरण की आवश्यकता महसूस करते हुए साहित्य को आम जनता के साथ उन्होंने कुशलतापूर्वक जोड़ा| अपनी भावनाओं कोभारत दुर्दशा' नाटक में व्यक्त करते हुए उन्होंने लिखा-

"भीतर तत्व न झूठी तेजी|
क्यों सखि सज्जन नहिं अंगरेजी|"[१]

द्विवेदी युग के साहित्यकारों ने भी स्वतंत्रता संग्राम में महत्वपूर्ण भूमिका निभाई| महावीर प्रसाद द्विवेदी, मैथिलीशरण गुप्त, श्रीधर पाठक, माखनलाल चतुर्वेदी आदि ने भी भारतीय स्वाधीनता हेतु अपनी तलवार रूपी कलम को और धारदार किया| इन कवियों ने आम जनता में राष्ट्रप्रेम की भावना जगाने तथा उन्हें स्वाधीनता आंदोलन का हिस्सा बनने हेतु प्रेरित किया| मैथिलीशरण गुप्त राष्ट्रकवि कहलाए| माखनलाल चतुर्वेदी ने भी 'पुष्प की अभिलाषा' कविता लिखकर सैनिकों के प्रति सामान्य लोगों के मन में सम्मान का भाव जागृत किया| सुभद्रा कुमारी चौहान ने 'झांसी की रानी' कविता के माध्यम से स्वाधीनता आंदोलन को तेज करने में अद्वितीय भूमिका अदा की| मैथिलीशरण गुप्त ने भारतवासियों को स्वर्णिम अतीत की याद दिलाते हुए वर्तमान और भविष्य को सुधारने की बात की| यथा-

"हम क्या थे? क्या है? और होंगे?
अभी आओ विचारे मिलकर यह समस्याएं|

राष्ट्रकवि मैथिलीशरण गुप्तने 'भारत भारती' में लिखा-

"जिसको न निज गौरव तथा निज देश का अभिमान है
वह नर नहीं नर पशु नीरा है और मृतक समान है|"[२]

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मैथिलीशरण गुप्त के अलावा सुभद्रा कुमारी चौहान की 'झांसी की रानी' कविता ने अंग्रेजों को लाल करने का काम किया| सुभद्रा कुमारी चौहान की 'झांसी की रानी' कविता को कौन भूल सकता है? जिसने अंग्रेजो की जड़ें हिला कर रख दी| वीर सैनिकों में देश प्रेम की भावना तथा जोश भरने वाली यह कविता आज भी प्रासंगिक है-

"सिंहासन हिल उठे, राजवंशों ने भृकुटी तानी थी,
बूढ़े भारत में भी आई फिर से नई जवानी थी,
गुमी हुई आज़ादी की कीमत सबने पहचानी थी,
दूर फिरंगी को करने की सबने मन में ठानी थी,
चमक उठी सन सत्तावन में वह तलवार पुरानी थी,
बुंदेले हरबोलों के मुंह हमने सुनी कहानी थी,
खूब लड़ी मर्दानी वह तो झांसी वाली रानी थी|"[3]

इसी प्रकार जयशंकर प्रसाद ने 'अरुण यह मधुमय देश हमारा' सुमित्रानंदन पंत ने 'ज्योति भूमि जय भारत देश', इकबाल ने 'सारे जहां से अच्छा हिंदुस्ता हमारा', तो बालकृष्ण शर्मा नवीन ने 'विप्लव गान' लिखा| इन सबके अलावा बंकिम चंद्र चटर्जी का देश प्रेम से ओतप्रोत गीत वंदे मातरम ने लोगों की रगों में उबाल ला दिया| अब किसी कीमत पर देश के लोगों को पराधीनता स्वीकार नहीं है|

'वंदे मातरम सुजलाम, सुफलाम, मलयज शीतलाम,
सस्य श्यामला मातरम वंदे मातरम...

देश प्रेम की भावना जगाने के लिए जय शंकर प्रसाद ने 'अरुण यह मधुमय देश हमारा', सुमित्रानंदन पंत ने 'ज्योति भूमि जय भारत देश', निराला ने 'भारती जय विजय करे स्वर्ग शिष्य कमल रे', कामता प्रसाद गुप्त ने 'प्राण क्या है देश के लिए', इकबाल ने सारे 'जहां से अच्छा हिंदुस्ता हमारा', तो बालकृष्ण शर्मा नवीन ने विप्लव गान में लिखा है-

'कवि कुछ ऐसी तान सुनाओ, जिससे उथल-पुथल मच जाए
एक हिलोर इधर से आए एक ही लोग उधर को जाए|'

यह कहकर रणबांकुरे में नई चेतना का संचार किया| इसी श्रंखला में शिवमंगल सिंह सुमन, रामनरेश त्रिपाठी, रामधारी सिंह दिनकर, राधाचरण गोस्वामी, बद्रीनारायण चौधरी प्रेमघन, राधा कृष्ण दास, श्रीधर पाठक, माधव प्रसाद शुक्ल, नाथूराम शर्मा शंकर, गया प्रसाद शुक्ल स्नेही, माखनलाल चतुर्वेदी, सियारामशरण गुप्त, अज्ञेय जैसे अगणित कवियों के साथ ही बंकिम चंद्र

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चटर्जी का देश प्रेम से ओतप्रोत वंदे मातरम गीत| देशभक्ति से ओतप्रोत एक अन्य रचना है जिसके जरिए माखनलाल चतुर्वेदी ने आजादी की बलिवेदी पर शहीद हुए वीर सपूतों के प्रति अगाध श्रद्धा दिखाई है| और बलिदानों को सर्वोपरि बताया है| एक फूल के माध्यम से उन्होंने अपनी बातों को जिस उत्कटता के साथ कहा है वह बेहद सराहनीय है|

"चाह नहीं मैं सुरबाला के
गहनों में गूंथा जाऊं|
चाह नहीं प्रेमी माला में
बिंध प्यारी को ललचाऊ|
चाह नहीं सम्राटों के शव,
पर, हे हरि डाला जाऊं|
चाह नहीं, देवों के सिर पर,
चढ़ूं भाग्य पर इठलाऊ|
मुझे तोड़ लेना वनमाली
उस पथ पर देना तुम फेंक
मातृभूमि पर शीश चढ़ाने
जिस पथ जावें वीर अनेक|"[४]

इसी तरह जंगे आजादी में अपनी रचनाओं के माध्यम से विशेष भूमिका निभाने वाले साहित्यकारों की एक लंबी फेहरिस्त है| जैसे- राधा कृष्ण दास, बद्रीनारायण चौधरी, प्रताप नारायण मिश्र, पंडित अंबिकादत्त व्यास, बाबू राम किशन वर्मा, ठाकुर जगमोहन सिंह, रामनरेश त्रिपाठी, सुभद्रा कुमारी चौहान, बालकृष्ण शर्मा नवीन जैसे रचनाकारों ने राष्ट्रीयता एवं देश प्रेम की ऐसी गंगा बहाई जिसके तीव्र वेग से जहां विदेशी हुक्मरानों की नीव हिलने लगी वही नौजवानों के अंतस्थ में अपनी पवित्र मातृभूमि के प्यार का जज्बा गहराता चला गया| एक और बंकिम चंद्र चटर्जी ने आनंद मठ में वंदे मातरम जैसी कालजई रचनाओं का सृजन किया तो कविवर जयशंकर प्रसाद की 'उठी हिमाद्रि तुंग श्रृंग से प्रबुद्ध शुद्ध भारती, स्वयंप्रभा सम उज्जवला स्वतंत्रता पुकारती' जैसी कविता ने लोगों के मन में राष्ट्रप्रेम की अखंडित धारा प्रवाहित की| इन कवियों ने अपनी कविताओं में राष्ट्रीयता के द्वारा भारतीय लोकतान्त्रिक ढांचे और परम्परा को कायम करने का प्रयत्न किया| साथ ही देश के लोगों में प्रेम और एकता को बढ़ावा दिया है|

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राष्ट्रीय शिक्षा नीति और हिंदी भाषा

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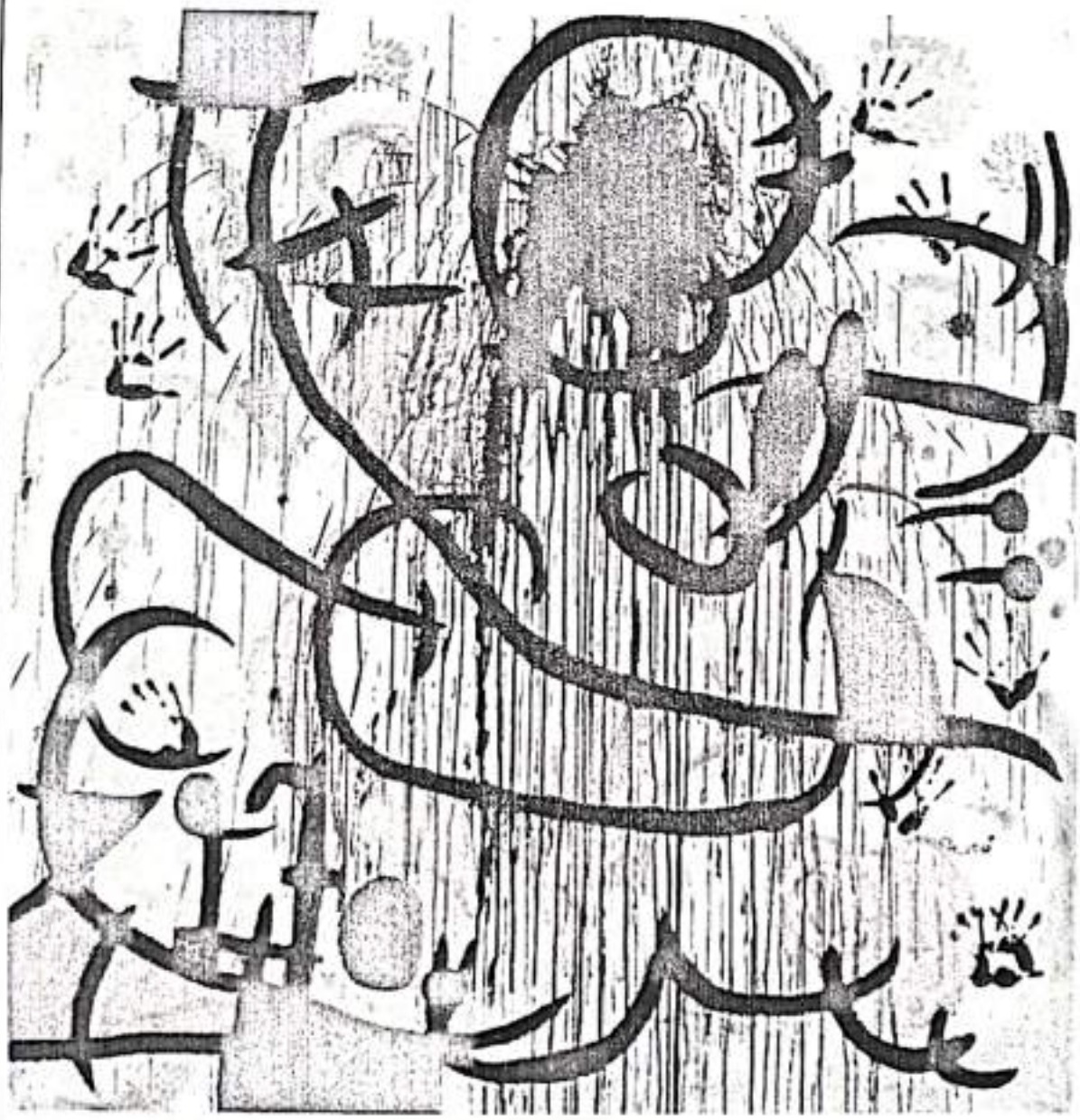
शिक्षा नीति पर जब भी चर्चा होगी तब भाषा पर अवश्य विचार होगा। भारत के संदर्भ में लगभग 3 दशकों के लंबे इंतजार के बाद भारतीय भाषाओं को प्राथमिकता देने के लिए नई शिक्षा नीति लागू हुई है। नई शिक्षा नीति में हिन्दी के साथ-साथ भारतीय भाषाओं का महत्व बढ़ाने का उदेश्य रहा है। इसमें प्राथमिक शिक्षा में मातृभाषा की अनिवार्यता को अपनाकर भारत भर में निज भाषा में शिक्षा के महत्व को प्रतिपादित किया है इससे भविष्य में हिंदी युग की स्थापना जरूर होगी। इस शिक्षा नीति की सबसे बड़ी विशेषता यह है कि इसमें भारतीय भाषाओं के बारें में समग्रता से विचार किया गया है।

राजभाषा हिंदी के विषय में हम जानते है कि, 14 सितंबर 1949 को संविधानिक स्तर पर हिंदी को राजभाषा और लिपि देवनागरी को मान्यता प्राप्त हुई थी| धारा 343 में कहा गया था कि, 'संघ की राजभाषा हिंदी और लिपि देवनागरी होगी और अंको का रूप अंतर्राष्ट्रीय रूप होगा। शासकीय प्रयोजनों के लिए अंग्रेजी भाषा का प्रयोग 15 वर्षों तक किया जाएगा।' इसके बाद 1965 तक हिंदी को राजभाषा के रूप में स्थापित कराने के आश्वासन को पुनः अनिश्चित समय तक बढ़ा दिया गया। कहां गया कि, 26 जनवरी 1965 के बाद भी हिंदी के अतिरिक्त अंग्रेजी भाषा संघ के राजकीय प्रयोजनों के लिए प्रयोग में लाई जाती रहेगी | यह अवस्था संविधान लागू होने से लेकर आज तक चली आ रही है।

समयांतर

शोध और संधान



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शोध और संधान *परिशिष्ट*

मार्च, 2023

लेख

आवरण चित्र : जोन मिरो

सुशीला टाकभौरे की कविता में स्त्री स्वर

सहदेव वर्षाराणी निवृत्तीराव

सुशीला टाकभौरे का दूसरा काव्य संग्रह 'यह तुम भी जानो' जो 1994 में प्रकाशित हुआ दलित और नारीवादी काव्य के संदर्भ में है। इसमें कवयित्री ने युवा पीढ़ी को रूढ़ि परंपराओं को तोड़ने का संदेश दिया है। वह अपनी कविताओं में शोषण और अन्याय के विरुद्ध आवाज उठाती हैं। नारी मन के अंतर्द्वंद्व का चित्र कविता का मुख्य विषय रहा है। इनमें शोषण के विरुद्ध विद्रोह और दुश्मनों को ललकार ने की चेतना है। इनमें कहीं यातना के स्वर हैं, तो कहीं चेतना के। कहीं शोषकों का धिक्कार है तो कहीं अन्याय के विरुद्ध अत्याचारियों से बदला लेने की हुंकार।

सुशीला टाकभौरे हिंदी दलित साहित्य की अग्रणी महिला साहित्यकारों में से एक हैं। अनेक बाधाओं को पार करते हुए उनकी लेखनी आज भी जारी है। उनके साहित्य में दलित नारी मुक्ति के स्वर सुनने को मिलते हैं। वैसे उन्होंने विभिन्न विधाओं में लेखन किया; लेकिन काव्य में उनकी विशेष रुचि रही। उनके *स्वाति बूंद और खारे मोती, यह तुम भी जानो, हमारे हिस्से का सूरज, तुमने उसे कब पहचाना* काव्यसंग्रह विशेष उल्लेखनीय हैं। दलित और श्रमिक वर्ग की उपेक्षा के प्रश्न और नारी का विद्रोह *स्वाति बूंद और खारे मोती* जैसे काव्य संग्रह में मुखरित हुए हैं। उनका यह प्रथम काव्यसंग्रह सन 1993 में प्रकाशित हुआ। इसमें कुल 61 कविताएं संग्रहित हैं। जिसमें 'धर्म विद्रोहिणी', 'डम्मोद', 'दस्तक', 'कड़वी बात', 'जरिया', 'पहचान', 'अपनी राह' आदि कविताओं में स्त्री प्रतिरोध दिखाई देता है।

टाकभौर का दूसरा काव्य संग्रह *यह तुम भी जानो* जो 1994 में प्रकाशित हुआ] दलित और नारीवादी काव्य के संदर्भ में है। इसमें कवयित्री ने युवा पीढ़ी को रूढ़ि और परंपराओं को तोड़ने का संदेश दिया है। वह इन कविताओं में शोषण के प्रति, अन्याय के विरुद्ध आवाज उठाती है। नारी मन के अंतर्दवंद अंतर्द्वंद्व का चित्र कविता का मुख्य विषय रहा है। इनमें शोषण के विरुद्ध विद्रोह और दुश्मनों को ललकार ने की चेतना है। कहीं यातना के स्वर हैं, तो कहीं चेतना के। कहीं शोषकों का धिक्कार है तो कहीं अन्याय के विरुद्ध अत्याचारियों से बदला लेने की हुंकार है।

कवियत्री के मत से आज के पुरुष प्रधान समाज में स्त्री मुक्ति, नारी स्वतंत्रता तथा उनके हक और अधिकारों को लेकर कितने भी बड़े दावे किए जाएं सब व्यर्थ हैं; जब तक कि नारी स्वयं इस तथ्य को नहीं समझती, तब तक उसकी प्रगति नहीं हो सकती। *यह तुम भी जानो* और *तुमने उसे कब पहचाना* कविता संग्रहों में वर्तमान युवा पीढ़ी को संदेश दिया है। उनके लेखन का विषय ही नारी चेतना है। नारी की दुर्दशा, सामाजिक रूढ़ियां, नारी पर बंधन आदि उनके काव्य-विषय रहे हैं। कवयित्री ने नारी की स्थिति का, उसकी सवेंदना का सहज चित्रण किया है। जब तक नारी स्वयं अपने लिए प्रयास नहीं करेगी तब तक उसकी स्थिति में परिवर्तन नहीं आएगा। यही संदेश उनके कविता 'सागर और आकाश' में दिया है —

मैं ढूंढती हूं क्षितिज रेखा
पूर्व से पश्चिम की ओर
मैं जान लेना चाहती हूं
क्षितिज के उस पार क्या है। 1

समाज सुधारकों ने स्त्री जागृति के विषय में जो कार्य किया उसका परिणाम नारी पर भी पड़ा है। वह अपनी स्थिति को समझकर उससे दूर हटने का प्रयास कर रही है। 'अपनी स्त्री' कविता में वह कहती हैं :

रोक नहीं पाओगे
स्त्री की ऊंची उड़ान को
काट नहीं सकोगे
उसके पंख
बांध नहीं सकोगे
उसके पैरों में परंपरा की बेड़ियां। 2

वर्तमान समय में नारी स्वतंत्र होना चाहती है। अपने पैरों में पड़ी सदियों की बेड़ियों को तोड़ना चाहती है। सदियों से नारियों का बहुत शोषण हुआ है; इसलिए नारी को अपनी स्थिति से बाहर निकालने के लिए कवयित्री अपनी कविता 'साहस' में कहती है-

हमें
सागर के पल्लर की तरह

लाट की तरह
हर क्षण
अपनी बेड़ियों को काटना है। 3

इस समाज ने बरसों से स्त्रियों को बंधनों में बांध के रखा है। वह अपना दर्द भी व्यक्त नहीं कर सकती। सारी सत्ता पुरुषों के हाथ में होती है। नारी का कोई स्वतंत्र अस्तित्व नहीं होता। इसी भाव को व्यक्त करते हुए 'यह कौनसा समाज है' कविता में कवयित्री कहती हैं:

यह कौन सा समाज है
बरसों से ठहरा है
बरसों से उसके पैरों में
वही हाथों में
व्याप्त, पवित्रता का बोझ
दासता, लाचारी, बेबसी
कोई परिवर्तन नहीं। 4

सुशीला जी की कविता पितृसत्तात्मक व्यवस्था द्वारा स्त्रियों पर थोपी गई गुलामी की बेड़ियों को तोड़ती है, स्त्री-पुरुष समानता को बढ़ावा देती है। सच्चाई यह है कि यह समाज नारी की भावनाओं को आज तक समझ ही नहीं पाया। समाज ने अपनी सहूलियत से व्यवस्था को बनाया। कवयित्री के शब्दों में:

मैं खड़ी रही
तुम्हारी दी गई जिम्मेदारियों का बोझ लिए
तुमने सब कुछ बनाया मेरे लिए
अपने लिए क्यों नहीं। 5

लेखिका के मत से महिला अपने आप को साबित करने में असमर्थ रही है। उनमें इतना साहस नहीं कि वह अपनी चेतना को जागृत करने की बात कर सकें। वे रूढ़ियां तोड़ने की बात करती हैं; पर साहस नहीं दिखा पातीं। अपनी 'साहस' कविता में कवयित्री कहती हैं-

चेतना है हमारे बीच
सदियों से पर
साहस का अभाव है। 6

टाकभौरे की कविताएं स्त्री की पक्षधर हैं। पुरुषसत्ता को चुनौती देते हुए भीषण यथार्थ को पाठकों के सामने रख स्त्री स्वतंत्रता को रेखांकित करती हैं। एक स्त्री और उसमें भी दलित स्त्री का दुख दोहरा है। कवयित्री दलित स्त्रियों के दुख का विवरण सागर से कर रही हैं। आखिर परंपरा के बंधनों में कब तक जकड़ी रहेंगी ये दलित स्त्रियां:

सागर बड़ा है
उसका तल बड़ा है
उसी तरह हमारी बेड़ियां
हमारी रूढ़ियां भी बड़ी हैं।

सुशीला जी अत्यंत संवेदनशील रचनाकार हैं। अपनी स्थितियों तथा परिवेश के प्रति अच्छी समझ रखती हैं। स्त्री जाति की अवस्था के लिए परिवेश को जिम्मेदार मानती हैं। युगों से चली आ रही परिपाटी पर चलने के लिए स्त्री अभिशप्त है। और अगर वह इस मार्ग से हटकर चलने की कोशिश करती है तो उजाले पर काले धुंए जैसी वह फैल जाती है। अपनी 'विद्रोहिणी' कविता के माध्यम से यह भावाभिव्यक्ति हुई है:

मां-बाप ने पैदा किया था
गूंगा!
परिवेश ने लंगड़ा बना दिया
चलती रही
निश्चित परिपाटी पर

बैसाखियों के सहारे
कितने पड़ाव आए। 8

स्त्री को अपनी अवस्था से परे होने के लिए विद्रोहिणी का रूप धारण करना ही होगा। जब तक वह स्वयं स्फुरित बन प्रयास नहीं करेगी तब तक उसकी अवस्था में परिवर्तन नहीं होगा।

गूंजती है आवाज सब दिशाओं में-
मुझे अनंत असीम दिगंत चाहिए
खुला आसमान चाहिए
आसमान की खुली छत चाहिए
मुझे अनंत आसमान चाहिए। 9

सुशीला जी की स्त्री उम्मीद से भरी है। वह बस परिवर्तन चाहती है। अपने वजूद की दुनिया चाहती हैं। अपने अस्तित्व की लड़ाई खुद के बलबूते पर लड़ना चाहती है। अपनी पाबंदी को दूर हटाना चाहती है। अपने अंदर प्रेम बचाना चाहती है। समाज उसकी हंसी छीन सकता है, पर उम्मीद की उड़ान नहीं। उनकी स्त्री उम्मीद से भरी है। उनकी कविता 'रोज गूंधती हूं पहाड़' में सब कुछ छिन जाने के बाद भी उम्मीद बाकी होने का भाव है:

वह स्त्री
बादलों की पीठ पर
हो चुकी है सवार
घूमना चाहती है
सूर्य का आंगन
उसे उम्मीद है
वह छू लेगी
सूरज की छत। 10

यह बिल्कुल स्पष्ट है कि, पुरुष की अपेक्षा नारी अपने जीवन में अधिक समस्याओं का सामना करती है। कवयित्री के मत से वर्तमान में नारी चेतना प्रबल हो रही है। वर्तमान समय में नारी अपने रिश्तों की साजिश की शिकार हो रही है। ऐसे समय में नारी अपने होने की तलाश कर रही है। आज की स्त्री अपनी शर्तों पर जीना चाहती है। परंपरागत बंधनों को तोड़कर नहीं हवा में सांस लेना चाहती है। आज

के समय की यह दुनियादारी वह समझने लगी है। 'भरोसा उधार' कविता में यही अनुभव होता है:

अब कुछ कुछ सोचने लगी हूं
किसी से कितना और
क्या-क्या छुपाना है। 11

आज की नारी इस नई चेतना के कारण अब किस्मत को दोष नहीं देती। अपना वजूद खुद तलाश रही है। वास्तव में सुशीला जी की कविता नारी मुक्ति का संदेश है। अपने प्रति अबला की मानसिकता को बदलकर सबला रूप में स्थापित होना चाहती है। अपनी समस्याओं के समाधान खुद ढूंढ रही है। नारी का प्रतिरोध व्यक्तित्व भर रहा है यही भाव इन पंक्तियों में देखा जा सकता है-

21वीं सदी की खानाबदोश औरतें
तलाश रही हैं घर
सुना है वे अब किसीकी नहीं सुनतीं
चीख चीख कर दर्ज करा

नहीं देती सुशीला जी की कविताओं रही है सारे
प्रतिरोध दोष नहीं देती 12

सुशीला जी की कविताओं का उद्देश्य स्त्रियों को जड़ मानसिकता से बाहर लाना है। उनका स्वर बोधगम्य चेतना का स्वर है। उनकी कविता स्त्री को परिवर्तित और जागरूक करने की साक्षी है। स्त्री अपने हक और अधिकारों के लिए लड़ना नहीं जानती थी। शिक्षा और ज्ञान के अभाव ने स्त्री को अपाहिज बना दिया था। नारी हमेशा से हाशिए पर रही। धर्म शास्त्रों की बेड़ियां और रुढ़ियों के कारण उसे सुरक्षित स्थान नहीं मिला। सुशीला टाकभौरे ने अपने निज को पहचाना है और इसीलिए नारी को जागृत करने का प्रयास कर रही हैं। उनकी कविता नारी को आत्मनिर्भर बनने में जरूर सहायक सिद्ध होंगी। नारी अपनी स्थिति को अच्छी तरह से जान गई है अब वह धरती से आकाश में जाना चाहती है। ऊंचाइयों को छूना चाहती है। संपूर्ण नारी जाति को संदेश देती हुई कवयित्री कहती है:

देखो कोई रोक ना पाए
बढ़ते कदमों की रफ्तार
भीड़ से अलग अपनी पहचान बनानी है। 13

सुशीला जी के *तुमने उसे कब पहचाना* काव्य संग्रह की कविताओं में नारी ने पुरुष को खुलकर चुनौती दी है। पुरुषवादी मानसिकता से अपने अस्तित्व की मांग की है। वह सामाजिक रूढ़ियों को तोड़ने का साहस कर रही है। सदियों से उसके मन में उभरे सवालों के जवाब मांगना चाहती हैं। 'तुमने उसे कब पहचाना' कविता की पंक्तियां यही भाव व्यक्त करती हैं-

तुमने उसे कब पहचाना
क्यों कहते हो नारी को
मानव समाज का गहना। 14

सुशीला जी की कविता स्त्री मन की भावनाओं को उजागर करती है। वह समाज में समानता की बात को उजागर कर रही है। स्त्री को परंपरा से चले आ रहे बंधनों से मुक्त कर उसके स्वतंत्र व्यक्तित्व को समाज में प्रतिष्ठित करना ही स्त्रीवाद है। अपनी बात रखना हमेशा के लिए मुश्किल काम रहा है। फिर भी ऐसी विसंगत स्थितियों में वे इस समाज व्यवस्था को तोड़ने का साहस करती रही हैं। कवयित्री अपनी 'जानकी जान गई' कविता के माध्यम से समाज को बताना चाहती है कि नारी भी समानता की अधिकारी है-

आज जानकी जब जान गई है,
अब वह धरती में नहीं/आकाश में जाना चाहती है
बिजली सी चमक कर/संदेश देना चाहती है
पुरुष प्रधान समाज में स्त्री भी/समानता की अधिकारी है। 15

सुशीला जी अपनी कविता के माध्यम से नारी समाज को अपने आप से मुक्त होने का संदेश दे रही है। आज की स्त्री अपने पैरों पर खड़ा होना चाहती है। अपनी जिम्मेदारियों का भी वहन करना चाहती है; लेकिन उसका संघर्ष दोहरा है, भीतरी और बाहरी। बावजूद इसके वह लड़ना जानती है। वास्तव में स्त्रियों के लिए सारे नियम पुरुषों ने अपनी सुविधा के लिए बनाए।

किंतु अब वह वास्तविकता पहचान चुकी है। जान गई है कि खुद का वजूद बढ़ाने के लिए उसे तुकराया जा रहा है। इसलिए अब वह ऐसे नियमों को नकार रही है। वर्तमान में बन रही नारी की पहचान को 'आज की खुद्दार औरत' में कवयित्री ने इस प्रकार प्रस्तुत किया:

आज यह खुद्दार औरत/अपने आप को पहचान गई है
इसे यूं ना सताओ/वरना यह भी तुम्हारे सर्वस्व को नकार कर

तुम्हें नौचा दिखाएगी। 16

शिक्षा का मार्ग

सुशीला जी ने नारी मुक्ति का एकमात्र मार्ग शिक्षा को बताया है। इस आघात से मुक्त होना है तो सिर्फ शिक्षा ही आवश्यक है। बिना शिक्षा के मुक्ति असंभव है। शिक्षा की कुंजी से ही महिलाएं अपना स्थान अर्जित कर सकती हैं। कविता 'वह मर्द की तरह जी सकेगी' में यही संदेश दिया है-

मान सम्मान में
ज्ञान विज्ञान में
पीछे नहीं है औरत

पूरे विश्व को मुट्ठी में रखकर समझेगी
तभी वह मर्द की तरह सकेगी। 17

इस तरह नारी को खुद पहले जागृत होना होगा तभी समाज उसके अस्तित्व को समझेगा। उसे खुद अपनी स्वतंत्रता तथा अधिकारों के लिए लड़ना होगा। यह जब तक नहीं होगा तब तक उसकी प्रगति नहीं होगी। उसे खुद अपनी समस्या को सुलझाना होगा। आज हम बड़े जोर-शोर से नारी स्वतंत्रता की बातें करते हैं लेकिन क्या सही में नारी स्वाधीन है? इसी प्रश्न के उहापोह के संदर्भ में सुशीला टाकभौरे की कविता समाहित है। सुशीला जी की कविताएं स्त्री को जागरूक और परिवर्तित करने की साक्षी है। इनकी कविताओं में

स्त्रियों की पीड़ा, बेचैनी और तिलमिलाहट का स्वर सुनाई देता है। उनकी कविताओं का उद्देश्य स्त्रियों को जड़ मानसिकता से बाहर लाना है। उनका स्त्री विमर्श अराजक मानसिकता से जुड़ा है और यह स्त्री विमर्श सामाजिक व्यवस्था को हिला सकता है। स्त्री की लड़ाई पुरुष से नहीं पुरुष वर्चस्व से है। उनकी कविताएं समाज परिवर्तन में मील का पत्थर साबित हो रही हैं। उनके स्त्री विमर्श में दलितों के विद्रोह का स्वर है। उनकी कविताओं में समाज में समानता का स्वर मिलता है। ■

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'परशुराम शुक्ल के बाल काव्य में राष्ट्रीय भावना'

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श्रीमती सुरेखा संदीप जाधव, निर्देशक

राष्ट्रीयता की भावना से तात्पर्य है कि अपने राष्ट्र के प्रति तन मन एवं धन से समर्पित होना। भारत में राष्ट्रीयता एवं देशप्रेम पूर्ण कविताओं का सृजन आजादी से पूर्व कुछ साहित्यकारों और क्रांतिकारियों ने किया था किंतु आजादी के बाद राष्ट्रीयता की भावना से युक्त बाल कविताओं का अकाल-सा पड़ गया है। शुक्ल जी ने इस रिक्तता को भरने का प्रयास किया है। राष्ट्र और राष्ट्रीयता सर्वोपरि है। राष्ट्र के समर्पण की भावना प्रत्येक नागरिक के हृदय में होनी चाहिए। इस बात की याद कवि साहित्यकार अपनी रचनाओं के माध्यम से दिलाते रहते हैं। बच्चों के हृदय में राष्ट्रीयता और मानवता की भावना को जागृत करने और पुष्ट करने के लिए अनेक बाल साहित्यकारों ने बाल साहित्य लिखा है। नवजागरण काल में जब राष्ट्रीय विचारधारा की लहर चल रही थी, अधिकांश कवियों ने राष्ट्रीय रचनाएं लिखकर बच्चों और बड़ों के हृदय में राष्ट्र-रक्षा तथा राष्ट्रीयता के भाव जागृत करने का प्रयास किया है।

इस संबंध में डॉ. उदय सिंह उदय जी का कथन द्रष्टव्य है, 'देश प्रेम एवं राष्ट्रीय चेतना की बाल कविताओं का सृजन अनेक बाल साहित्यकारों ने किया जिनमें मैथिलीशरण गुप्त से लेकर डॉ परशुराम शुक्ल, अजय जनमेजय, डॉ. गणेश दत्त सारस्वत, डॉ.चक्रधर नलिन, भानु दत्त त्रिपाठी, भगवती प्रसाद गौतम, डॉ. श्री प्रसाद, डॉ. हरीश निगम, सोहनलाल द्विवेदी, कृष्णा शलभ, डॉ. रोहिताश्व अस्थाना, डॉ. प्रकाश मनु, डॉ. गोपाल सिंह, शेष बलवीर सिंह, रंग रामनिरंजन, डॉ. निरंकार देव सेवक एवं घमंडी लाल अग्रवाल के साथ-साथ अवध किशोर सक्सेना डॉ राज गोस्वामी आदि हैं। जहां बाल साहित्यकारों ने प्रचुर मात्रा में बाल गीतों को संजोया वहीं भारतीय कवयित्रियों ने भी देश प्रेम और राष्ट्रीय चेतना से परिपूर्ण बाल गीतों का सृजन किया है, जिनमें प्रमुखता से सुमित्रा कुमारी चौहान, पद्मा गांवकर, उषा यादव, डॉ मधु भारतीय, डॉ शकुंतला कालरा एवं डॉ अनामिका रिछरिया आदि हैं। सुप्रसिद्ध बाल साहित्यकारों ने देश प्रेम एवं राष्ट्रीय चेतना के बाल गीतों का सृजन कर बचपन से ही बालकों में राष्ट्रीय चेतना का संचार करने तथा उनमें जोश एवं उत्साह भरने का प्रयास किया है; जिससे बालकों के अंदर देश के प्रति सच्ची श्रद्धा उत्पन्न हो सके और उनमें ऐसी भावना पैदा हो सके कि राष्ट्र के हित के लिए अपने प्राणों को न्यौछावर करने में भी न हिचकिचाएँ और हंसते-हंसते देश की खातिर प्राणों का बलिदान कर शहीद हो जाएँ'[1]

परशुराम शुक्ल ने बालकों में राष्ट्र रक्षा के क्षेत्र में प्रेरणा और प्रोत्साहन देने के लिए इस प्रकार के वर्णन पर्याप्त मात्रा में किए हैं-

सूरज जैसे काम करो तुम / जग में अपना नाम करो तुम / शूरवीर बलवान बनो तुम /

सभी गुणों की खान बनो तुम / दुखियों के वरदान बनो तुम /
एक भले इन्सान बनो तुम / सच्चे और महान बनो तुम / भारत माँ की शान बनो तुम।'

महात्मा गांधी की जीवन शैली राष्ट्रीयता का प्रतीक बन गई है। भारत देश के राष्ट्रपिता महात्मा गांधी जी ने देश की स्वतंत्रता के लिए नई दिशाएं दी हैं। उन्होंने अहिंसा, असहयोग आंदोलन, सविनय अवज्ञा आंदोलन, भारत छोड़ो आंदोलन का नेतृत्व किया था तथा अन्य स्वतंत्रता सेनानियों के साथ मिलकर अंग्रेजों को भारत छोड़ने के लिए मजबूर किया था। भारत देश के पहले प्रधानमंत्री पंडित जवाहरलाल नेहरू ने पंचशील का सिद्धांत प्रतिपादित किया था। लोकतांत्रिक परंपराओं को मजबूत करना, धर्मनिरपेक्ष चरित्रों का निर्माण करना, राष्ट्र और संविधान के माध्यम से देश की अर्थव्यवस्था सुचारु करना उनके मुख्य उद्देश्य रहे। इस संदर्भ में शुक्ल जी ने बच्चों को राष्ट्रीय प्रबोधन करते हुए लिखा है-

खेतों में पानी पहुंचाकर, / हरे भरे पेड़ लगाकर / दुखी और निर्धन कृषकों के,/
ओठों पर मुस्कान बिछाकर / पीडित मानवता के दुख का, /
हम मिलकर उपचार करेंगे।
गौतम, गांधी और नेहरू के, / सपने हम सरकार करेंगे।'[3]

राष्ट्रभक्ति की भावना सबसे श्रेष्ठ है। हर एक नागरिक के मन में यह होना चाहिए। बच्चों के मन में राष्ट्रीयता की भावना जागृत करने हेतु शुक्ल जी ने अपनी अनेक बाल कविताओं के माध्यम से गांधी जी की विचारधारा के मूल्य सत्य, अहिंसा के महत्व को बताया है। इस प्रकार की कविताओं के माध्यम से बच्चों के मन में बापू के प्रति जिज्ञासा के भाव दिखाई देते हैं। साथ ही उनके व्यक्तित्व की छाप उन पर दिखाई देती है-

दी तुमने आजादी हमको, बिन हथियार उठाए /
गर्व सभी को उस दिन पर, जिस दिन तुम बापू आए।।
अंग्रेजी निर्मम शासन से, तुमने हमें बचाया।
सत्य, अहिंसा और धर्म का, हमको पाठ पढ़ाया।।'[4]

शुक्ल जी ने बालमन को एक नई प्रेरणा देते हुए भारतवर्ष को महान बनाने की राह बालकों को दिखाई है, जिस पर चलकर वे भविष्य में अपने राष्ट्र के प्रति सदैव प्रयत्न कर सकेंगे; राष्ट्रीयता और देशप्रेम से लबालब होंगे। उन्होंने 'फौजी कहलाते हैं' कविता के माध्यम से भारत माता का गुणगान किया है। साथ ही प्रेरणा दी है कि कितनी भी विकट परिस्थिति सामने आ जाए परंतु हमें निडर होकर अपने देश के स्वाभिमान की रक्षा करनी चाहिए एवं समस्त देशवासियों में भाईचारे को अपनाना चाहिए, यही प्रेरणा देते हुए शुक्ल अपने बाल कविता में लिखते हैं-

भारत मां का सच्चा सेवक, फौजी कहलाता है। / पर्वत नदियां आओ समंदर, /
देख नहीं घबराते हैं / जब तक मंजिल हाथ न आए, / आगे बढ़ता जाता है। /
शाम सवेरे देश प्रेम के, सबको गीत सुनाता है। / बर्फीला चट्टानों में भी, /

सजग हमेशा रहता है।/ आधी पानी सर्दी गर्मी, / दम पर अपने जाता है।'[5]

राष्ट्रधर्म की भावना को बाल साहित्य में सर्वोपरि महत्व दिया गया है क्योंकि बालकों का मन मस्तिष्क स्थायी रूप से प्रभाव ग्रहण करता है। इस अवस्था के संस्कार बालक को जीवन भर मार्गदर्शन देते हैं। शुक्लजी वर्तमान युग के श्रेष्ठ बाल साहित्यकार हैं। इन्होंने बाल साहित्य की सभी विधाओं के माध्यम से राष्ट्रीयता और मानवता का संदेश दिया है। राष्ट्रीयता और मानवता के पोषण की चेतना जागृत की है। राष्ट्रीय एकता की चेतना जागृत करते हुए उन्होंने लिखा है -

'हम बच्चे छोटे-छोटे हैं, हम साहस हिम्मत वाले हैं।
है गर्व हमें भारत मां पर, हम भारत के रखवाले हैं।
हम करते गर्व अहिंसा पर, बापू के पुत्र निराले हैं।
सीमा के दुश्मन सावधान, हम भारत के रखवाले हैं।'[6]

झांसी की रानी लक्ष्मीबाई स्वाभिमानी, आत्मविश्वासी और धर्मनिष्ठुर रानी है। रानी कभी किसीसे डरती नहीं थी। प्रलोभन उसे कर्तव्य पालन से विमुख नहीं कर सकते। यह उद्गार लक्ष्मीबाई के हैं। 'मैं अपनी झांसी नहीं दूंगी' यह वाक्य रानी के मुख से प्रस्फुटित हो गया। अंग्रेजों से लड़ते समय रानी जमीनदोस्त पड़ गई। झांसी की रानी के कर्तव्य से बच्चों को राष्ट्रीयता की प्रेरणा देने के लिये कवि लिखते हैं -

आओ बच्चों! तुम्हें सुनाएँ, गाथा एक पुरानी
जिसने गौरव को ललकारा, वह झांसी की रानी।
सन अट्ठारह सौ पैंतिस में, उसने जन्म लिया था
कर न सका जो कोई अब तक, ऐसा काम किया था।
मुँह बोली बहना नाना की, साहस, हिम्मतवाली
वह तलवार चलाती ऐसे, वार न जाता खाली।
तेरह वर्षों में बन बैठी, गंगाधर की रानी।
झांसी नगरी में आ पहुंची, गढने एक कहानी।'[7]

परशुराम शुक्ल जी की अधिकतम बाल कविताएं राष्ट्रीय भावना से भरी हुई हैं; प्रणोती पाटील जी लिखती हैं- 'परशुराम शुक्ल की बाल साहित्य की मूल भावना राष्ट्र निर्माण की है। बालक आगे चलकर अच्छा नागरिक बने और राष्ट्र निर्माण में, शांति व्यवस्था में, समृद्धि के कार्यों में पूर्ण योगदान प्रदान करे, इसी दृष्टिकोण को ध्यान में रखकर शुक्ल जी ने काव्य रचना की है।'[8]

'कर्तव्य' बाल कविता में परिवार और समाज में मिल जुलकर रहते समय नैतिकता का पालन करना जरूरी है। परिवार एवं समाज में नाता जोड़ने का काम नैतिकता कर सकती है। बच्चों को पुण्य और पाप का महत्व समझाने के लिए उन्होंने प्रबोधन किया है। बच्चों को देशप्रेम की प्रेरणा देने के साथ-साथ दीपक बनकर भारत मां की सेवा करने का शुक्ल ने अपने काव्य में सुंदर ढंग से चित्रण किया है-

नैतिकता ने नाता तोड़ा, पुण्य पाप से बाजी हारा।
मानवता भी बाँझ हो गई, पशुता ने वह पाँव पसारा।।
ऐसे में कुछ कर दिखलाना, बनता है कर्तव्य तुम्हारा।
दीपक बनकर भारत माँ के, दूर करो जग का अँधियारा।।'[9]

'बच्चों की सरकार' कविता में वर्तमान शिक्षा प्रणाली पर गहरा प्रहार करते हुए बालकों की शिक्षा में आने वाली रुकावटों को दूर करने का प्रयास किया है ताकि शिक्षा प्रणाली छात्र-प्रधान हो न कि शिक्षक प्रधान। परशुराम शुक्ल जी ने 'बच्चों की सरकार' कविता के माध्यम से बालकों को राष्ट्रीय प्रेरणा दी है-

भारत के नन्हें-मुन्ने, छाई खुशी अपार। /
आज शपथ लेने वाली है, बच्चों की सरकार।/
पहले दिन संसद में आए, मुद्दे केवल चार। /
नव निर्वाचित सब बच्चों ने, रखे नए विचार।
भारी बस्ता कठिन पढ़ाई, मार डांट फटकार।
सबने मिलकर सिद्ध कर दिया, यह चारों बेकार।।[10]

'सौराष्ट्र' कविता संग्रह की कविताओं में शुक्ल ने भ्रष्टाचार न करने का प्रबोधन बच्चों से किया है। अफसर अपने पद का दुरुपयोग करके देश की संपत्ति का शोषण करता है। देश के भष्ट नेताओं द्वारा किया गया घोटाला या एक ग्वाले द्वारा दूध में पानी मिलाना भी भ्रष्टाचार का स्वरूप है। देश का लचीला कानून भ्रष्टाचार होने का प्रमुख कारण है। भ्रष्टाचारी लोग मस्तिष्क में सदैव अपने धन को बढ़ाने की प्रबल इच्छा रखते हैं। नेता और अफसर अपना काम जल्दी कराने के लिए उन्हें पैसे देते हैं। आज के यथार्थ परिवेश से कवि बच्चों को परिचित कराते हैं। अच्छाई की होली जलाकर भ्रष्टाचारी कैसे दिवाली मना रहे हैं तथा नेतागण सामान्य लोगो का शोषण कर टैक्स के नाम पर केवल अपनी मोटी जेबें भर रहे हैं। अतः यह भ्रष्टाचार होता है। इस भष्टाचार को रोकने के लिए उन्होंने लिखा है-

सत्य, अहिंसा, सदाचार की, होली जलती आज देश में।
और दिवाली मना रहे हैं, भष्टाचारी कुटिल वेश में।।
नेता, अफसर भष्ट हो गये, जीवन भर यह शोषण करते।
टैक्स, टैक्स और टैक्स लगाकर अपनी मोटी जेबें भरते।।'[11]

'अधिकार और कर्तव्य' कविता में शुक्ल ने बच्चों को देश के संविधान के विषय में प्रबोधन किया है। भारत देश का संविधान दुनिया का सबसे लम्बा लिखित संविधान है। संविधान को धर्म- शास्त्र, विधि-शास्त्र आदि नामों से भी जाना जाता है। दुनिया का सबसे अच्छा संविधान भारत देश का माना जाता है। संविधान की नजर में सब एक समान हैं। सबको अधिकार और कर्तव्य एक समान है। संविधान में बड़ा- छोटा, अमीर-गरीब सबके लिए एक जैसे पुरस्कार दिये हैं। कवि ने अपने संविधान का सुंदर

ढंग से चित्रण किया है-

संविधान आजादी वाला, बच्चों! इस दिन आया। /
इसने दुनिया में भारत को, नव गणतंत्र बनाया।।
क्या करना है और नहीं क्या संविधान बतलाता। /
भारत में रहने वालों का, इससे गहरा नाता ।।
यह अधिकार हमें देता है, उन्नति करने वाला। /
ऊंच-नीच का भेद न करता, पंडित हो या लाला।।
हिंदू, मुस्लिम, सिख, ईसाई, सब हैं भाई भाई। /
सबसे पहले संविधान ने, बातें यही बतलाई।।'[12]

बच्चों को राष्ट्र-प्रेम और देशभक्ति की शिक्षा दिए जाने पर शुक्ल जी ने बाल सतसई में देश-भक्ति और देश-प्रेम के नाम पर व्यापार करने वाले राजनेताओं की भी निंदा की है। बच्चों को अगर बाल्यकाल से ही देशभक्ति का मूल्य समझाएंगे तो देश की सारी समस्याएं अपने आप समाप्त होंगी और बच्चे बापू-नेहरू तथा बोस की तरह सब कुछ भुला के देश सेवा में रत हो जाएंगे।-

बचपन से ही दीजिए, देशभक्ति का ज्ञान। / देशभक्त बच्चे अगर, होगा देश महान।।
बच्चों के आदर्श है, बापू, नेहरू, बोस। /
देश प्रेम सम्मुख जिन्हें, रहा न कुछ भी होश।।
जहां राष्ट्रभाषा नहीं, गूंगा है वह देश। / डूब मरो सब शर्म से, बच्चों का आदेश।।'[13]

'तिरंगा' बाल कविता में बच्चों को अपने दूषित प्रजातंत्र तथा अन्याय के प्रति जागरूक व्यवस्था को बदलते हुए अपना राष्ट्रीय दायित्व पूर्ण करने की बात की है। बच्चों में देश के प्रति दायित्व बोध का ज्ञान कराने का सुंदर प्रयास किया है। सभी में एक नई चेतना लाने की बात कवि करते हैं। ज्ञान से अज्ञान को दूर कर देश को स्वर्ग बनाने का संदेश कवि देते हैं। आपस में कभी न लड़ने की सौगंध उठाने को कहते हैं। राष्ट्रीयता की प्रेरणा देते हुए इन्होंने लिखा है-

अखिल विश्व में सबसे ऊंचा / अपना ध्वज फहराओगे।
बच्चों ! तुम यह करो प्रतिज्ञा भारत स्वर्ग बनाओगे।।
बड़े बड़े उद्योग लगाकर, खेतों में पानी पहुंचाओ।
नये ज्ञान का दीप जला कर, सबमें नयी चेतना लाओ।।'[14]

समग्र विवेचन के आधारपर हम कह सकते है कि, हिंदी बाल काव्य में राष्ट्रीयता की भावना प्रमुख रही है। हिंदी बाल साहित्यकार परशुराम शुक्ल ने बच्चों में राष्ट्रीय भावना जागृत करने के उद्देश्य से राष्ट्रीय भावना से परिपूर्ण काव्य लिखा हैं। 'तिरंगा' काव्य संग्रह नवजागरण का अग्रदूत है। इसमें देश के अतीत गौरवगान से लेकर देश प्रेम की भावना का वर्णन मिलता है। शुक्ल जी ने अपनी बाल कविताओं में बच्चों की राष्ट्रीय भावना, राष्ट्रीय चेतना, राष्ट्रीयता की प्रेरणा जगाने का प्रयास किया है। उनकी अनेक

कविताओं में भारतमाता का गुणगान किया गया है। साथ ही अपने देश के स्वाभिमान की रक्षा का संदेश, नैतिकता का पालन, राष्ट्रप्रेम, राष्ट्रीय एकता की चेतना उनकी अनेक कविताओं में दृष्टिगत होती है।

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1990 नंतरच्या कवितेवरील जागतिकीकरणाचा परिणाम

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सार

1990 नंतर भारतीय अर्थव्यवस्थेसह जीवनाच्या सर्वच क्षेत्रात अमूलाग्र बदल अनुभवण्यास मिळू लागले. एक साचेबद्ध आणि पारंपारिक जीवनाला मुक्त आकाश मिळाले. एकाधिकारशाही संपुष्टात आली आणि उदारीकरण किंवा जागतिकीकरणाच्या प्रवाहात आपला देश एक नवे संक्रमण अनुभवू लागला. मुक्त अर्थव्यवस्थेने येथील सर्व गणितच बदलून टाकले. 'आपण आणि आपले ' हा विचार मागे पडला आणि 'हे विश्वची माझो घरं ' या न्यायाने संपूर्ण जग एका छताखाली आल्याचा अनुभव आपल्याला येऊ लागला. भारतीय अर्थव्यवस्थेवर जसा परिणाम जागतिकीकरणाचा झाला तसचा परिणाम येथील कला, साहित्य आणि संस्कृतीवर देखील झाला. आपल्या साचेबद्ध साहित्याची मांडणी मागे पडली आणि मुक्त अर्थव्यवस्थे सारखेच मुक्तछंदात मुक्त विषय काव्यातून मांडल्या जाऊ लागले. विविध वर्गातून, जातिजमातीतून लिहिता झालेला लेखकवर्ग पुढे येऊ लागला. नागर, महानगर, ग्रामीण, दलित अशा सर्वच वर्गातून आलेले लोक नव्या वर्तमानाला प्रतिक्रिया देऊ लागले. यामध्ये भाषेची देखील तोडमोड होऊ लागली. अनेक नवीन शब्द आपल्या भाषेत रुढ होऊ लागलेत. जागतिकीकरणाचा प्रवाह एवढा तीव्र होता की आपल्या पारंपारिकतेला त्याने जबर धक्का दिला. आपल्या कवी–लेखका ंनी हे सर्व बदल टिपण्यास आपल्या साहित्यातून प्रारंभ केला. विशेषतः मराठी कवितेने हे बदल लवकरटिपले. 'जे न देखे रवि ते देखे कवी' या उक्तीनुसार आमच्या मराठी कवींनी आपल्या कवितेत बदल स्विकारला. जागतिकीकरणाचा परिणाम या कवींच्या प्रतिभेवर झाला. काव्याचे विषय बदलू लागले. जागतिकीकरणाच्या रेटयात हरवलेला, भौतिक गरजांच्या आहारी गेलेला, पावलापावलावर संकटाला तोंड देणारा सामान्य माणूस, नव्याने उदयाला आलेली मॉलस ंस्कृती हे कवींच्या काव्यलेखनाचे विषय होऊ लागले. नवकवी विविधांगी आशयसूत्रांचा वेध घेवू लागले. याप्रमाणेच वेगवेगळया प्रकारे अभिव्यक्त होऊ लागले.

प्रस्तावना

1960 ते 1990 पर्यंत काव्य लेखन करणाऱ्या कवींनी त्यांच्या कवितेला एक स्वतंत्र ओळख दिली. अरुण कोलटकर, दिलीप चित्रे, ना.धो. महानोर, ग्रेस, वसंत आबाजी डहाके, विलास सारंग, भालचंद्र नेमाडे, चंद्रकांत पाटील, सतीश काळसेकर, गुरुनाथ धुरी, वसंत गुर्जर आदी कवींच्या कवितेतून काव्यलयी ंची विविधता अनुभवाला मिळाली. अनेक लयींचा प्रयोजक आणि अर्थपूर्ण वापर या कवींनी केला. ओवी, अभंग, पोवाडे, लावण्या मात्रावृत्ते –अक्षरवृत्ते, विविध ठिकाणची व गटांची लोकगीते, वेगवेगळया भूप्रदेषातील भाषीक उच्चारण्याची शैली, वेगवेवगळया बोली या सर्वांमधून प्रत्ययाला येणाऱ्या भाषिक लयींचा आविष्कार या कवींनी केला. साठोत्तरी कवितेला भाषीक लयींबाबत संपन्न वारसा लाभला. 1990 नंतर जागतिकीकरणाने एकूणच मानवी आयुष्याच्या अनेक अंगांना स्पर्श केला. या काळात काव्यलेखन करणाऱ्या कवींना नव्वदोत्तरी कवी हे नामाभिधान दिलेले आहे. या काळात ज्यांनी आपल्या कवीतेतून काव्याच्या प्रांतात ठसा उमटविला त्यामध्ये श्रीधर तिळवे, मंगेश काळे, सलील वाघ, नितीन कुळकणी, मन्या जोशी, हेमंट दिवटे, संजीव खांडेकर, वर्जेश सोळेंकी, प्रवीण बांदेकर, अजय कांडर, अनिल कांबळी, वीरधवल परब आदी कवींचा उल्लेख करावा लागेल. त्यातील अनेक कवींनी स्वतःच आपली भाषिक वाट शोधत काव्यातून विविध लयींच्या शक्यता आजमावल्या. कवी नितीन कुळकर्णी यांची कविता या लयीचे उत्तम उदाहरण आहे.

''वार तिथ सुट्टया, वर्ष रजा प्रवास जन्म
वाचलो वाचलो वाचलो वाचलो वाचलो''
(सगळं कसं अगदी सैफेनाए)

रोजचं जगणं हे एक संकट आहे आणि यातून कवी 'वाचलो, वाचलो...' म्हणतो आहे. 'वाचलो' या शब्दा ंच्या पुनरुक्तीतून जी लय साधली आहे. ती या मरणाच्या संकटाला अधिक गडद करते आहे. नव्वोदत्तरी काळात काव्यलेखन करणाऱ्या कवी ंनी स्वतःची अशी लय कवितेतून जोपासलेली दिसते. या

कवींच्या कविता या मुक्तशैलीचा वापर करताना दिसतात. तर काही कवींच्या कविता या गद्यलयीचा आश्रय घेतात.

''कोण लिहितोय कविता
भोकं पडलेली
शब्द कोंबून कोंब ूनही
जी बुजत नाहीयेत''
(भोकं–मेंदूतल्या शांततेलाही पडलेली)

''टी.व्ही. चालू आहे
टी.व्ही. समोर नाचतोय मुलगा
उलटासुलटा
बदलतोय चॅनल्स
मी चिडतोय त्याच्यावर
मी त्याला मारावं की मारु नये ?
शांततेला भोक
नाही मारलं तरी''
(चौतिशीपर्यंतच्या कविता)

हेमंट दिवटे यांची ही कविता हे बोलणेच आहे. स्वतःच्या जगण्याचा अनुभव लिहून कवितेतून मोकळं होण्याची कवीची इच्छा शब्दबद्ध केली आहे. या कवीतेची मांडणी कोणत्याही यमक, अनुप्रास, अलंकाराचा वापर न करता केली आहे. पडलेली, नाहीयेत, पडतंय या क्रियापदांचे उपयोजना, छोटी, छोटी वाक्यरचना यांतून कवितेत एक लय साधली आहे. नव्वदोत्तरी अनेक कवींच्या कवितेत अशा गद्यलयी आढळतात.

''शेवटी अगदी जवळच्या व्यक्तीचा मृत्यूही आपण
सहजतेने जिरवतो
पहिल्या पहिल्यांदा तर तसबीरीवर नेमांन चढवतो
ताज्या फुलांचा हार
नंतर नंतर फ्रेमवरची धूळ पुसरण्यासही येत जातो
मनस्वी कंटाळा
प्रिय, असा एक दिवस आज नाही की तुझी

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इतिहासाचार्य वि. का. राजवाडे मंडळ, धुळे
या संस्थेचे त्रैमासिक

।। संशोधक।।

पुरवणी अंक १३ – जून २०२४ (त्रैमासिक)

- **शके १९४६**
- **वर्ष : ९२**
- **पुरवणी अंक : १३**

✷ प्रकाशक ✷

श्री. संजय मुंदडा

कार्याध्यक्ष, इ. वि. का. राजवाडे संशोधन मंडळ, धुळे ४२४००१
दूरध्वनी (०२५६२) २३३८४८, ९४२२२८९४७१, ९४०४५७७०२०

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कार्यालयीन वेळ

सकाळी ९.३० ते १.००, सायंकाळी ४.३० ते ८.०० (रविवारी सुट्टी)

लेख सदस्यता वर्गणी : रु. २५००/–

विशेष सूचना : संशोधक त्रैमासिकाची वर्गणी चेक/ड्राफ्टने
'संशोधक त्रैमासिक राजवाडे मंडळ, धुळे' या नावाने पाठवावी.

अक्षरजुळणी : सौ. सीमा शिंत्रे, पुणे.

हिन्दी भाषा में कृत्रिम बुद्धि का प्रयोग

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शोध सार :

दुनिया में सबसे कठीण चीज मनुष्य के दिमाग को समझना है। आज एक ऐसी एडवांस मशीन आ चुकी है, जो इंसान के दिमाग को समझ सके, निर्णय ले सके, अपनी भावनाएं साझा कर सके। अर्थात इंसानी दिमाग-विवेक हम मशीन में डाल रहे है। इसे ही कृत्रिम बुद्धिमत्ता या आर्टिफीशियल इंटेलीजेंस कहा जाता है। इसी कृत्रिम बुद्धि का अर्थ है- बनावटी तरीके से विकसित की गई बौद्धिक क्षमता, जिसके तहत रोबोट्स किसी भी हालत में मनुष्य की तरह सोच सके और उसके मुताबिक निर्णय ले सके।

बीजशब्द : कृत्रिम बुद्धि, प्रादौगिकी, भाषा शिक्षण में कृत्रिम बुद्धि

मूल आलेख :

कृत्रिम बुद्धिमत्ता की शुरुआत 1950 के दशक में ही हो गई थी, लेकिन इसे 1970 के दशक में महत्त्व प्राप्त होने लगा। दुनिया में सबसे पहले जपान इस देश ने इसकी पहल की। फिर धीरे-धीरे ब्रिटेन, अमरिका एवं यूरोपियन देशों ने भी इसकी ओर ध्यान दिया और नई-नई तकनीके इजाद होने लगी। कृत्रिम बुद्धि आज मनुष्य को सहायता करने वाला केवल एक उपकरण नहीं, बल्कि इसमें खुद की रचनात्मकता का गुण भी आए इसके प्रयास जारी है और इसमें काफी हद तक हम सफल भी हुए है।

सही में दुनिया बहुत तेजी से बदल रही है। इस बदलाव का सबसे प्रमुख कारण डिजिटल क्रांति है। आने वाले वर्षों में हम एक नए विश्व का सामना कर सकते हैं जिसमें कृत्रिम बुद्धिमत्ता एक महत्वपूर्ण भूमिका निभाएगी। यह एक तेजी से विकसित क्षेत्र है, और यह संभावना है कि कृत्रिम बुद्धि का उपयोग भाषा के क्षेत्र में और अधिक तरीकों से किया जाएगा। कृत्रिम बुद्धि (एआई) के साथ हिन्दी का भविष्य उज्ज्वल है और यह देखना दिलचस्प होगा कि आने वाले वर्षों में इसमें क्या नए विकास होते हैं। कृत्रिम बुद्धि हिन्दी को अपनी सेवाओं को बेहतर बनाने और उपयोगकर्ताओं को अधिक सक्षम बनाने में मदद कर सकती है। प्रस्तुत शोधआलेख में, हम उन्नत तकनीकी विकासों की दिशा में एक नज़र डालेंगे जो कृत्रिम बुद्धिमत्ता में हो रही हैं। साथ ही विकास और प्रगति का एक अवलोकन प्रस्तुत करेंगे।

कृत्रिम बुद्धि के प्रभाव से हिंदी सहित अन्य भारतीय भाषाएँ भी दूर नहीं रह सकती। समयानुसार बदलाव के साथ तालमेल बिठाना हर भाषा के लिए जरुरी भी है, नहीं तो हम जानते है कि, ऐसी कितनी भाषाएँ समय के साथ लुप्त होती गई है। कृत्रिम बुद्धि का उपयोग जिम्मेदारी के साथ किया जाए तो निश्चित रुप से भाषाओँ के विकास के नए रास्ते खुलेंगे।

कृत्रिम बुद्धि (एआई) कंप्यूटर विज्ञान की एक शाखा है; जो मशीनों को बुद्धिमान बनाने के लिए डिज़ाइन करती है। कृत्रिम बुद्धि सॉफ्टवेयर और हार्डवेयर का उपयोग करके मशीनों को समस्या-समाधान, सीखने, और निर्णय लेने जैसे कार्यों को करने के लिए सक्षम बनाती है। कृत्रिम बुद्धि सामान्य प्रौद्योगिकी से अलग है। सामान्य प्रौद्योगिकी पहले से निर्धारित काम करती है, लेकिन कृत्रिम बुद्धि समयानुसार किसी भी स्थिति में मनुष्य की तरह निर्णय ले सकती है।

आज हम कृत्रिम बुद्धि पर आधारित उपकरणों की दुनिया में प्रवेश कर रहे है। जैसे-जैसे दुनिया तेजी से एक-दूसरे से जुड़ती जा रही है, कई भाषाओं में कुशलता न केवल फायदेमंद है बल्कि एक आवश्यकता भी है। और प्रौद्योगिकी अब केवल एक उपकरण नहीं है, बल्कि सीखने की प्रक्रिया का एक अभिन्न अंग है। भाषा सीखने के पारंपरिक तरीके विकसित हो रहे हैं, जो कृत्रिम बुद्धि की शक्ति का उपयोग करने वाले नवीन दृष्टिकोणों के लिए रास्ता बना रहे हैं। भाषा सीखने के लिए कृत्रिम बुद्धि का भविष्य रोमांचक है। प्रौद्योगिकियां पहले से कहीं अधिक तेजी से विकसित हो रही हैं, इसके लिए हमें तैयार रहना होगा।

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कृत्रिम बुद्धि के सामान्य उपयोगी क्षेत्र :

कृत्रिम बुद्धि का उपयोग कई अलग-अलग क्षेत्रों में किया जाता है, जिसमें शामिल हैं-

1. **स्वास्थ्य-** कृत्रिम बुद्धि का उपयोग डॉक्टरों को निदान करने, दवाओं की सिफारिश करने, और रोगियों की देखभाल करने में मदद करने के लिए किया जाता है। सटीक दवा में कृत्रिम बुद्धि का अनुप्रयोग फायदेमंद हो सकता है । यह भविष्यवाणी करना कि विभिन्न रोगी विशेषताओं और उपचार संदर्भ के आधार पर रोगी पर कौन से उपचार सफल होने की संभावना है।
2. **वित्त-** कृत्रिम बुद्धि का उपयोग निवेश निर्णय लेने, जोखिम को कम करने, और धोखाधड़ी का पता लगाने में मदद करने के लिए किया जाता है।
3. **सॉफ्टवेयर-** कृत्रिम बुद्धि का उपयोग ट्रांसलेशन, और ऑटोमेटिक राइटिंग जैसे कार्यों को स्वचालित करने के लिए किया जाता है।
4. **शिक्षा-** कृत्रिम बुद्धि का उपयोग छात्रों को व्यक्तिगत रूप से सीखने में मदद करने, कक्षा को अधिक सक्रिय बनाने, और छात्रों के लिए अधिक लचीलेपन प्रदान करने के लिए किया जाता है। इलेक्ट्रॉनिक्स और सूचना प्रौद्योगिकी मंत्रालय ने इस साल अप्रैल में युवाओं के लिये जिम्मेदार AI कार्यक्रम लॉन्च किया था।, जिसमें सरकारी स्कूलों के 11,000 से अधिक छात्रों ने कृत्रिम बुद्धि में बुनियादी पाठ्यक्रम पूरा किया। केंद्रीय माध्यमिक शिक्षा बोर्ड ने स्कूली पाठ्यक्रम में AI को एकीकृत किया है ताकि यह सुनिश्चित किया जा सके कि पास होने वाले छात्रों को डेटा साइंस, मशीन लर्निंग और आर्टिफिशियल इंटेलिजेंस का बुनियादी ज्ञान और कौशल हो।
5. **पुलिस व्यवस्था में-** कृत्रिम बुद्धि की मदद से केंद्रीय डेटाबेस के साथ चेहरे की पहचान के मिलान, अपराध के पैटर्न के अनुमान और सीसीटीवी फुटेज के विश्लेषण द्वारा संदिग्धों की पहचान की जा सकती है। सरकार सभी रिकॉर्ड (विशेष रूप से अपराध रिकॉर्ड) का डिजिटलीकरण कर रही है; वह इसे CCTNS नामक एक ही स्थान पर एकत्र कर रही है जहाँ किसी अपराधी या संदिग्ध की तस्वीरों, बायोमीट्रिक्स या आपराधिक इतिहास सहित सभी डेटा उपलब्ध हैं।
6. **कृषि-** कृत्रिम बुद्धि कृषि डेटा का विश्लेषण करने में मदद करती है। किसान अपने निर्णयों को बेहतर ढंग से सूचित करने के लिये अपने खेत से एकत्रित मौसम की स्थिति, तापमान, पानी के उपयोग या मिट्टी की स्थिति जैसे कारकों का विश्लेषण कर सकते हैं।
7. **कृषि में परिशुद्धता-** सटीक कृषि पौधों, कीटों और खेतों में खराब पौधों के पोषण में बीमारियों का पता लगाने में सहायता के लिये कृत्रिम बुद्धि तकनीक का उपयोग करती है।
8. **जल प्रबंधन, फसल बीमा और कीट नियंत्रण-** इंटरनेशनल क्रॉप्स रिसर्च इंस्टीट्यूट फॉर सेमी-एरिड ट्रॉपिक्स आईसीआरआईएसएटी ने एक AI-पावर बुवाई ऐप विकसित किया है, जो स्थानीय फसल उपज और वर्षा पर मौसम मॉडल और डेटा का उपयोग करता है ताकि स्थानीय किसानों को अपने बीज बोने के बारे में अधिक सटीक भविष्यवाणी और सलाह दी जा सके।
9. **महामारी से निपटने के लिए-** कोविड -19 प्रतिक्रिया के लिए, संचार सुनिश्चित करने के लिये चूर्त्वों द्वारा AI-सक्षम चैटबॉट का उपयोग किया गया था। इंडियन काउंसिल ऑफ मेडिकल रिसर्च (ICMR) ने कोविड -19 पर देश भर में विभिन्न परीक्षण और नैदानिक सुविधाओं से फ्रंटलाइन स्टाफ और डेटा एंट्री ऑपरेटरों के विशिष्ट प्रश्नों का उत्तर देने के लिये अपने पोर्टल पर वाटसन सहायक को तैनात किया है।

कृत्रिम बुद्धि एक तेजी से विकसित क्षेत्र है, और इसका उपयोग हमारे जीवन के कई क्षेत्रों में होने की संभावना है। मानव बुद्धि की तरह कृत्रिम बुद्धि भी मानव समूह से बात करना चाहती है। वह आपके कुछ शब्दों को समझना चाहती है, बोलना चाहती है। वह आपकी बोलचाल की भाषा का विश्लेषण करके आत्मसात करती है। इसलिए आज के इस आधुनिक दौर में मशीन के साथ बातचीत का दौर शुरू होना चाहिए।

कृत्रिम बुद्धि एक ऐसी तकनीक है जिसमें कंप्यूटर या अन्य इलेक्ट्रॉनिक उपकरण का उपयोग बौद्धिक कार्यों के लिए किया जाता है। हिंदी में कृत्रिम बुद्धि की पहुँच बढ़ती जा रही है और आजकल विभिन्न क्षेत्रों में इसका उपयोग किया जा रहा है। आधुनिक युग में सोशल मीडिया, विपणन, मनोरंजन, शिक्षा, पर्यटन आदि सभी क्षेत्रों में कृत्रिम बुद्धि की आवश्यकता महसूस की जा रही है। कृत्रिम बुद्धि पर आधारित नई तकनीक को स्वीकृति मिल रही है।

कृत्रिम बुद्धि (Artificial intelligence) के अंतर्गत मशीनों में मानव जैसी बौद्धिक क्षमता विकसित करने का प्रयास किया जाता है ताकि मशीनें परिस्थितियों के अनुरूप निर्णय ले सकें तथा बिना मानवीय आदेश के कार्य कर सकें।

कृत्रिम बुद्धि के भाषा शिक्षण में उपयोग :

तकनीक के क्षेत्र में भाषा का प्रवेश अत्यंत महत्त्वपूर्ण है। तकनीकी विकास के साथ भाषा का विकास सम्भव है। इसलिए आज कृत्रिम बुद्धि आधारित तकनीक के साथ हमें सदैव हरपल बातचीत करनी चाहिए तभी कृत्रिम बुद्धि संवाद और लिखने में सक्षम और तत्पर बनेगी।

हिंदी के लिए कृत्रिम बुद्धि की स्थिति अभी भी विकास की अवस्था में है। अनुवाद, भाषा संशोधन, भाषा सिंथेसिस और भाषा विश्लेषण जैसे क्षेत्रों में कृत्रिम बुद्धि का उपयोग होता है। हिंदी के लिए अनुवाद का क्षेत्र विशेष रूप से महत्त्वपूर्ण है, क्योंकि विभिन्न भाषाओं के बीच अनुवाद के लिए उच्च गुणवत्ता का उत्पादन करना मुश्किल हो सकता है।

इसके अलावा, विभिन्न भाषा संशोधन उपकरण, जैसे कि शब्दकोश, विवरणकारी भाषा प्रोग्राम और वाक्य पुनर्गठन उपकरण भी हिंदी के लिए उपलब्ध हैं। हालाँकि, इन उपकरणों की गुणवत्ता और उपयोगिता को बढ़ाने के लिए विशेष कार्यक्रम की आवश्यकता है। कृत्रिम बुद्धि भाषा शिक्षण क्षेत्र में कई तरीक़ों से उपयोगी हो सकती है। कुछ अधिक महत्त्वपूर्ण उपयोग निम्नलिखित हैं:

1. **व्यक्तिगत शिक्षण:** कृत्रिम बुद्धि उपयोगकर्ता के अनुकूल शिक्षण पाठ्यक्रम बनाने में सक्षम होती है। यह छात्रों की अवधि, गति, और उनकी उद्देश्यों के आधार पर शिक्षण की व्यवस्था करती है।
2. **भाषा अनुवाद:** कृत्रिम बुद्धि भाषा अनुवाद में उपयोगी होती है, जिससे अलग-अलग भाषाओं के बीच संचार करना सम्भव होता है। इससे विदेशी भाषाओं को सीखने और समझने में भी सहायता मिलती है।
3. **शब्दावली विस्तार:** कृत्रिम बुद्धि शब्दावली का विस्तार करने में भी सक्षम होती है। इससे छात्रों को विभिन्न शब्दों, उनके अर्थों और उपयोग के संदर्भ में विस्तृत ज्ञान प्राप्त होता है।
4. **स्पष्टता के साथ बोलना और सुनना:** कृत्रिम बुद्धि शिक्षण के दौरान छात्रों को स्पष्टता के साथ बोलने और सुनने का अभ्यास का लाभ मिलता है।

कृत्रिम बुद्धि पर आधारित कुछ ऐप :

1. भाषा संगम- एक भारत श्रेष्ठ भारत के तहत भारत सरकार के शिक्षा मंत्रालय, चींश्रींळलहरीहळ द्वारा मुफ़्त में भारतीय भाषाएँ सीखने हेतु ङ्गभाषा संगमफ मोबाइल ऐप विकसित किया है। इसमें कृत्रिम बुद्धि के आधार पर अनुवाद, उच्चारण, शब्दकोश आदि जानकारी मिलेगी। भारत के लोगों को ऐप के माध्यम से विभिन्न भाषाओं में रोज़मर्रा की बातचीत के बुनियादी वाक्य सीखने का अवसर प्राप्त होगा। आप अपने देश की विशाल और समृद्ध संस्कृति के द्वार किसी भी भाषा के द्वारा खोल सकते हैं। भाषा संगम द्वारा विभिन्न राज्यों और केंद्र शासित प्रदेशों के लोग आपसी बातचीत और सम्पर्क के माध्यम से भारत की समृद्ध सांस्कृतिक विविधता को समझ सकते हैं। राष्ट्रीय स्तर पर सांस्कृतिक सम्बन्ध सुदृढ़ हो जायेंगे।
2. **राजभाषा लीला–** भारत सरकार के राजभाषा विभाग और सी-डैक द्वारा विकसित लीला राजभाषा ऐप से अब भारतीय भाषाओं का उपयोग सहज हुआ है। लीला-राजभाषा कृत्रिम बुद्धि के माध्यम से भारतीय भाषाओं को सीखने की ऐप है। हिंदी सीखने के लिए एक बहु-मीडिया आधारित बुद्धिमान स्व-शिक्षण ऐप है। लीला (Learn Indian languages through Artificial Intelligence) का उपयोग करके, अपने मोबाइल पर हिंदी भाषा सीखना वास्तव में आनंददायक और आसान है।
3. **माइक्रोसॉफ़्ट–** अगर आपकी भाषा पर पकड़ है और आप धाराप्रवाह बोलते हैं तो आप विंडोज़ 10 में डिक्टेट फ़ीचर सक्रिय करके कंप्यूटर पर तेज़ गति से लिख सकते हैं। हिंदी में डिक्टेट करने के लिए, आप माइक्रोसॉफ़्ट गैरेज स्टोर से उपलब्ध ऑफ़िस 365 के लिए डिक्टेट प्लगइन इंस्टाल कर सकते हैं, जो माइक्रोसॉफ़्ट वर्ड, पॉवरपॉइंट और आउटलुक में काम करता है। अपनी भाषा में सक्षम होना इसके साथ साथ अपनी भाषा को दूसरों तक पहुँचाना भी अत्यंत महत्त्वपूर्ण है। आप माइक्रोसॉफ़्ट कृत्रिम बुद्धि (Microsoft AI) से संचालित अनुवाद सुविधा के साथ हिंदी सहित 60 से अधिक भाषाओं में उनका अनुवाद कर सकते हैं।
4. **चैट जीपीटी (Chat gpt)–** चैट-जीपीटी में चैट का अर्थ है बातचीत और जीपीटी का अर्थ है-जेनरेटिंग प्री-ट्रेनिंग। जीपीटी चैट बॉट के कारण हिन्दी भी अब नई तकनीक की दिशा में अग्रसर हो रही है। चैट-जीपीटी अभी स्कूली बच्चा है लेकिन आनेवाले दिनों में भारतीय भाषाओं में दक्ष होकर यूनिवर्सिटी रिसर्च स्कॉलर बनेगा।

और भी बहुत से ऐप है, जो हमारी सुविधा के लिए काम कर रहे है। जिससे हमारा समय और मेहनत काफी मात्रा में बच

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रहे है। इस प्रकार, हमने कृत्रिम बुद्धिमत्ता प्रौद्योगिकी से संबंधित विभिन्न पहलुओं को समझने का प्रयास किया और विशेष रूप से इस प्रौद्योगिकी के क्षेत्र में भारत में किए गए अनुप्रयोगों पर ध्यान केंद्रित किया। हमने इस आलेख को लिखते समय हमने भारत में कृत्रिम बुद्धिमत्ता प्रौद्योगिकी से संबंधित विभिन्न पहलुओं को शामिल करने का प्रयास किया है।

निष्कर्ष :

ऊपर किए गए विश्लेषण के आधार पर यह कहा जा सकता है कि कृत्रिम बुद्धिमत्ता प्रौद्योगिकी में छिपी हुई संभावनाएँ उनके द्वारा उत्पन्न की जाने वाली चुनौतियों की तुलना में कहीं अधिक सकारात्मक हैं। इसीलिए विश्व के समस्त समुदायों को कृत्रिम बुद्धिमत्ता प्रौद्योगिकी को और अधिक बढ़ावा देने के लिए एकजुट होकर आगे बढ़ना चाहिए तथा इस प्रौद्योगिकी के माध्यम से वैश्विक भलाई और मानवीय भलाई की तरफ अग्रसर होना चाहिए। इसके कुछ नकारात्मक पक्ष भी है, जैसे, पारंपरिक रोजगार खत्म हो जाएंगे। संसद में रिपोर्टर और तत्क्षण अनुवाद के काम करने वाले लोगों की नियुक्ति रोकी गई है। लेकिन जिस तरह कंप्यूटर के आने के बाद नए तरह के काम सामने आए, कृत्रिम बुद्धि भी वैसे ही रोजगार के नए अवसर पैदा करेगी। आपसी संपर्क के चलते भाषाएं कहीं ज्यादा सहज, कहीं ज्यादा समृद्ध होंगी और इसका फायदा उनके साथ ही हिन्दी को भी मिलेगा।

विशेष रूप से भारत के दृष्टिकोण से देखें तो भारत ने अभी तक इस दिशा में काफी सराहनीय कार्य किया है और वह निरंतर कर भी रहा है। भारत को इस क्षेत्र में अनुसंधान और विकास पर अपने खर्च को बढ़ाना चाहिए। तभी इस प्रौद्योगिकी के वास्तविक लाभ हासिल किए जा सकेंगे। इस प्रौद्योगिकी के अधिक से अधिक इस्तेमाल के माध्यम से भारत अपने सतत विकास लक्ष्यों को प्राप्त कर सकेगा तथा अपने देश के समग्र विकास में महत्वपूर्ण भूमिका निभा सकेगा। कृत्रिम बुद्धि का निर्माण हमारी सभ्यता के इतिहास की सबसे बड़ी घटना है, लेकिन यह भी ध्यान रखना होगाके, इसमें जोखीम भी है। बहुत से लाभों के बावजूद इसके अपने खतरे भी है।

संदर्भ :

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Environmental exposure and nanotoxicity of titanium dioxide nanoparticles in irrigation water with the flavonoid luteolin

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Different concentrations of titanium oxide nanoparticles (TiO_2NPs) have been frequently reported in treated wastewater used for the irrigation of crops. Luteolin is a susceptive anticancer flavonoid in many crops and rare medicinal plants that can be affected by exposure to TiO_2NPs. This study investigates the potential transformation of pure luteolin in exposure to TiO_2NP-containing water. In an *in vitro* system, three replicates of 5 mg L^{-1} of pure luteolin were exposed to TiO_2NPs (0, 25, 50, 100 ppm). After 48 h exposure, the samples were extensively analyzed by Raman spectroscopy, ultraviolet-visible (UV-vis) spectroscopy, and dynamic light scattering (DLS). A positive correlation was found between TiO_2NPs concentrations and the structural alteration of luteolin content, where over 20% of luteolin structure was allegedly altered in the presence of 100 ppm TiO_2NPs. The increase of NPs diameter (~70 nm) and dominant peaks in Raman spectra revealed that luteolin was adsorbed onto the TiO_2NPs surface. Further, the second-order derivative analysis confirmed the transformation of luteolin upon exposure to TiO_2NPs. This study provides fundamental insight into agricultural safety measures when exposed to air or water-borne TiO_2NPs.

Introduction

Irrigation of treated wastewater has become an increasingly popular solution for water scarcity and wastewater management worldwide.[1,2] Treated wastewater is a valuable source of nutrients and water for agriculture, landscaping, and non-potable uses. However, using treated wastewater for plants and crop irrigation raises concerns about potential contamination with nanoparticles (NPs).[3,4] NPs enter the wastewater treatment system through industrial discharges and agricultural activities.[5] The presence of NPs in treated water pose risks to human health and the ecosystem. For example, the total dissociated Ti ions, the core ion of TiO_2NPs, was reported in the range of 3200–43000 μg m^{-3} in treated wastewater.[1,6,7] The built-up concentration of NPs and dissociated ions and bioaccumulation is of high concern.

According to the World Health Organization (WHO) report, about 80% of primary health care in many developing countries relies on medicinal plants.[8] These plants contain secondary metabolites, known as Plant-Derived Medicinal Compounds (PDMC), which provide irreplaceable pharmacological properties for treating various diseases, including cancer. PDMC contains essential pharmacological properties with sustainable and low-cost biomass sources to be used as medicaments. Sustainable PDMC production is crucial for those who rely on nature-based products as well as the vegan population. However, environmental pollutants such as NPs affect plant growth, development, crop yield, and the metabolism of primary and secondary metabolites. The rapid development of nanotechnology has led to the high contamination of NPs, jeopardizing the production of high-quality and rare PDMC. Studies have shown that the PDMC contain reactive molecular groups (*i.e.*, OH) and surface charges that may trigger their potential reaction with NPs.[9,10] Previous studies have also demonstrated that exposure to metal oxide NPs induces the release of antioxidant enzymes and changes the cellular macromolecule compositions in medicinal plants.[11,12] It has been suggested that reactive oxygen species (ROS) which induces by metallic oxide NPs, also affect the transcription of secondary metabolites, leading to the alteration of PDMC.[13] For example, TiO_2 NPs upregulated anthocyanin and other flavonoid transcription in *A. thaliana*, *Oryza sativa* L and *N. tabacum*,[14–16] and Ag NPs inhibited Ribulose-1,5-bisphosphate

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carboxylase/oxygenase (Rubisco) activity in *Spirodela polyrhiza* L.[17] Despite the nanotoxicity effects, some studies have reported a positive response in the production of PDMC. For example, Fazel *et al.* 2016 reported that Ag–Au-NPs mixed with naphthalene acetic acid induced maximum level of medicinal flavonoid (6.71 mg g^{-1}-DW) in *Prunella vulgaris* L.[18] The effects of NPs on medicinal flavonoids in the literature is limited to soil and hydroponic studies.[19,20] However, the airborne NPs contamination of medicinal plants and exposure to cellular PDMC is highly neglected.

Luteolin (5,7,3′,4′-tetrahydroxyflavone) is an anticancer PDMC in sensitive medicinal plants.[21,22] Luteolin has been prescribed for a wide range of diseases due to its various medicinal properties.[23] Its anticancer effects stem from its ability to inhibit tumor growth, induce apoptosis or programmed cell death in cancer cells, and modulate various signaling pathways commonly altered in cancer cells. Luteolin also exhibits anti-inflammatory and antioxidant activities, which may contribute to its anticancer effects by reducing oxidative stress and inflammation, two factors that can promote cancer development.

However, luteolin's aromatic structure and hydroxyl groups make it more sensitive to heavy metal and metal oxide NPs contamination. Studies have shown that luteolin acts as a metal chelator, which affects the bioavailability, original properties, and potential toxicity of various metals through the bioavailability of organic metal species.[24] For example, divalent lead (Pb^{2+}), which causes neurological and bone disorders, forms a chelate with luteolin.[21,25] Furthermore, chelating of luteolin with divalent and trivalent cationic metals such as Ca^{2+}, Zn^{2+}, Mg^{2+}, Fe^{3+}, and Cu^{2+} have been frequently reported.[26,27] Luteolin is highly susceptible to deformation due to poor hydrophobicity and bioavailability.[28] However, the reaction of luteolin with intact NPs has not been investigated.

TiO_2NPs in the atmosphere can agglomerate on plant surfaces and penetrate leaves through cuticle-free areas such as trichomes and/or stomata bases.[29] However, their diffusion will be altered by the NPs' size, surface charge, concentration, and coating materials. Also, their interaction with secondary metabolites will vary depending on the active moiety of the reactive molecular groups. Despite many studies on the interaction of NPs with plants, understanding the dynamics of PDMC in response to NPs is still in its infancy. Recent investigations have shown the hormetic effects of TiO_2NPs at a concentration range of 0–2500 mg L^{-1} on the growth, biochemical and physiological behaviors of the medicinal plant *Nigella arvensis*.[30] For example, inhibitory effects were found at ≥1000 mg L^{-1} TiO_2NPs, where chlorophyll and carotenoid synthesis were reduced.[30] At 1000 mg L^{-1}, TiO_2NPs significantly promoted cellular H_2O_2 generation and increased antioxidant enzyme activities, including superoxide dismutase, ascorbate peroxidase, and catalase.[30] Additionally, they enhanced total antioxidant content, total iridoid content, and 2,2-diphenyl-1-picrylhydrazyl scavenging activity. Therefore, the potential transformation of luteolin's structure and degradation due to direct exposure or indirectly through enzymatic and macromolecular alteration in response to TiO_2NPs is highly expected.

TiO_2NPs were found in both dissociated ion and intact NPs forms in cellular pH.[31] However, their reciprocal effects on luteolin have not been investigated. This study investigated the potential interaction between luteolin and TiO_2NPs-containing water in an *in vitro* system using extensive spectroscopy analysis. The specific objectives of this study were (i) to elucidate the effects of TiO_2NPs on the transformation of luteolin under *in vitro* conditions and (ii) to provide evidence of the potentially destructive effects of TiO_2NPs on luteolin. This investigation will provide a basis for further research on potential nanotoxicity levels of TiO_2NPs on rare PDMC.

Materials and methods

Reagents

Negatively charged titanium oxide nanopowder (TiO_2NPs) with the composition of anatase and 99% purity (20 nm) was purchased from US Research Nanomaterials, Inc. (Houston, TX). All reagents and solvents were provided at analytical grade quality. High-purity luteolin (≥98% (TLC), powder) was obtained from Sigma Aldrich (Milwaukee, WI). In each dispersion batch, deionized water (Millipore Milli-Q system, USA) was applied. All the laboratory glassware material was washed with soap and rinsed with 10% (v/v) HNO_3 (Merck, Germany) before use.

TiO_2NPs Characterization

The TiO_2NPs was extensively characterized before the exposure experiment by field emission-transmission electron microscope, FE-TEM (Hitachi 7700, Hitachi Ltd, Tokyo, Japan) and scanning electron microscope (JEOL JSM 6360). Briefly, a droplet of dispersed TiO_2NPs in an aqueous phase was placed onto a carbon-coated copper grid, the grids were air-dried for 1 h until a thin layer of TiO_2NPs was formed. The prepared sample was analyzed by TEM and SEM. The NPs size of all the samples was calculated by the controls method. The TiO_2NPs structure was confirmed by X-ray diffraction using Philips PW-1710 X-ray diffractometer with CuKα radiation (λ = 1.54178 Å). The FT-IR spectra were recorded in the range of 400 to 1000 cm^{-1} on the instrument PerkinElmer, IR spectrophotometer (model E-2829) in KBr pellets.

In vitro experiments

In vitro experiments in triplicate were used to study the TiO_2NPs effects on the transformation of luteolin. TiO_2NPs concentrations (0, 25, 50, and 100 mg L^{-1}) were selected based on reported environmentally relevant TiO_2NPs concentrations.[1] The NPs dispersions of each *in vitro* bioreactor was prepared in 50 mL propylene centrifuge tubes. All the tubes, including the negative controls, were subjected to sonication at 25 °C with 150 W for 10 min to ensure full NPs dispersion. The pH of each solution was measured right after dispersion before the exposure process. The final concentration of 5 mg L^{-1} of luteolin was added to each tube. To evaluate the potential alteration of luteolin in short-term exposure, all the treatments were shaken at 100 strokes per min at a controlled temperature for 48 h at

25 °C (New Brunswick Scientific, Edison, NJ). After the luteolin–TiO_2 NPs interaction process, the pH of the solution was measured. In parallel, three concentrations of TiO_2NPs without luteolin ($n = 3$) and a series of pure luteolin without NPs were also prepared. Both intact NPs and luteolin were also subjected to the same sonication process. To filter the potential coagulates of luteolin with NPs and intact NPs from the luteolin species, 5 mL of the solution was centrifuged ($8000\times g$) for 90 min using Amicon Ultra-15 centrifugal filter (NMWL = 3 kDa, Merck Millipore). The concentrations of luteolin in the filtrate were considered unreacted, or the byproduct was subtracted from the control containing only luteolin.

Raman spectroscopy analysis

Raman spectroscopy was used to confirm the interaction of luteolin with the TiO_2NPs and detect possible molecular alteration using a ProRaman-L (Enwave Optronics) with an excitation laser of $\lambda_{exc} = 532$ nm. The acquisition period was 10 s, and 15 average accumulations.

Ultraviolet-visible (UV-vis) spectroscopy

The luteolin concentration in each treatment of the *in vitro* experiments was quantified using two methods of full scan method (200–700 nm) and the second-order derivative method of UV-vis spectroscopy 360. A sample of deionized water was scanned to subtract the baseline drift and noise before the sample was read. This experiment was processed under the condition of room temperature. The measurements were recorded at 2.5 nm absorbance mode for the sampling interval under fast scan speed (adjusting slit width to 5.0 nm). Eqn (1) shows the relationship for calculating the adsorbed luteolin onto TiO_2NPs surface:

$$q_e = \frac{(C_0 - C_e)V}{W} \quad (1)$$

where C_0 and C_e are the initial and final concentrations (mg L^{-1}) of the luteolin, respectively, present in the equilibrium to analyze potential interaction. The adsorption capacity (q_e) indicates the amount of luteolin (mg) adsorbed per unit of mass (g) of TiO_2NPs, where W and V denote the mass of TiO_2NPs and the volume of the batch solution (L), respectively.

Nanoparticle size monitoring

To investigate the potential adsorption of luteolin on the surface of TiO_2NPs, a solution containing only 25 ppm dispersed TiO_2NPs and a solution containing a mixture of 25 ppm TiO_2NPs and 5 mg L^{-1} luteolin after 48 hours (pH: 8) exposure were used. A volume of 2.5 mL from each solution was transferred to a 4.5 mL plastic cuvette with 10 mm optical path length (Fisher Scientific, USA) to measure the change of hydrodynamic size of TiO_2NPs, using dynamic light scattering (DLS, N5 Submicron ParticleSize Analyzer, Beckman Coulter). Deionized water was used as the diluent with a scattering angle of 90°. The hydrodynamic particle size distribution for each sample was quantified through two 5 min sequences, and the reported values were the average of five continuous measurements. The surface charge was -39.2 ± 2.4.

Structural analysis of luteolin–TiO_2 NPs interaction

The molecular structural analysis for the TiO_2 NPs was computed using Multiwfn software,[32] which can describe the crystal structure of synthesized NPs. The interactions between the luteolin and TiO_2 NPs were projected with VMD 1.9.4 visualization software.[33]

Statistical analysis

Statistical analysis of luteolin concentrations after filtration was performed using Minitab 21.1 (Minitab Inc., State College, PA, USA). All datasets were acquired on a mean basis for triplicates in each treatment. The mean values of each experimental set were compared using a one-way analysis of variance (ANOVA) followed by Tukey's test. The significance level was 5% ($p < 0.05$).

Results and discussion

Characterization of TiO_2 NPs

The representative FE-SEM and TEM images of the (101) facet of the TiO_2 NPs sample are exhibited in Fig. 1A and B, indicating the octahedral morphologies. As shown in Fig. 1C, TiO_2NPs have anatase properties with a well-crystallized structure, in good agreement with the JCPDS data file NO. 21-1272.[34,35] The polymorph of anatase TiO_2NPs has a dominant (101) facet (>98% of total area) owing to its high thermodynamic stability. In contrast, the other orientations were at minimal. According to the higher catalytic reactivity of other orientations than that of (101) surface, we found that TiO_2NPs with dominant (101) facet could exhibit higher interaction with luteolin molecules due to semi-occupied surface area, reaching more exposure, resulting in high adsorption capacity. Fig. 1D shows the typical FT-IR spectra of TiO_2NPs in the spectral region 400–1600 cm^{-1}. The absorption bands observed within this range are an indication of the formation of single-phase metal oxides.

Effects of TiO_2NPs on the luteolin transformation using UV spectrum analysis

Typical UV-vis spectra of pure luteolin and its content in exposure to three levels of TiO_2NPs are shown in Fig. 2A. Luteolin dominated the light absorption between 350–450 nm, with maximum absorption recorded around 350 nm, which was used to process the lost luteolin content (Fig. 2B). At three significant changes, exposure to TiO_2NPs indicated a significant loss or transformation of the luteolin content. Exposure to 100 ppm TiO_2NPs resulted in a maximum loss of 20%, and by reducing the TiO_2NPs to half, the lost content decreased only by 18%, suggesting the threshold level of cellular damage may be less than 50 ppm TiO_2NPs. Two primary mechanisms may explain luteolin's behavior in exposure to TiO_2NP. The first pathway may be driven by the surface adsorption of luteolin onto TiO_2-NPs, as previous studies have shown the high potential of TiO_2NPs on drug delivery and adsorption.[36] However, the

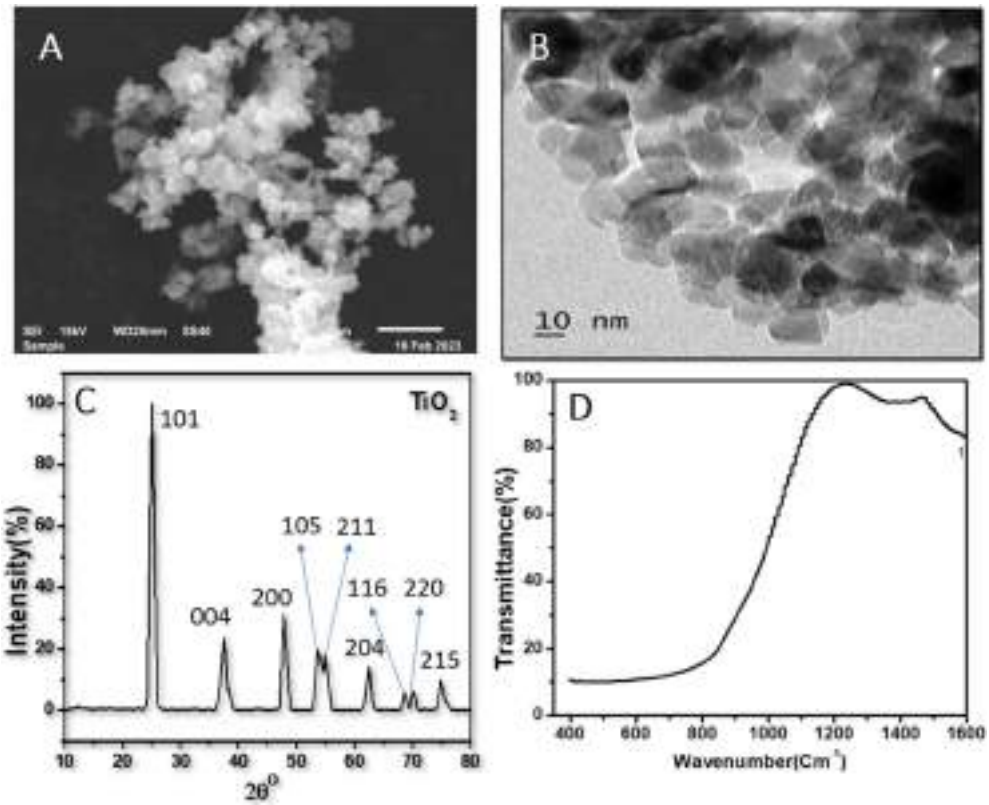

Fig. 1 Charecterization information of the TiO_2 nanoparticles (A) show a representative FE-SEM photograph, (B) TEM image, showing the homogenous size of dispersed NPs (C) XRD patterns of anatase phase and (D) FT-IR Spectra.

second mechanism suggests that luteolin may partially transform due to the destructive behavior of induced reactive oxygen species (ROS) in exposure to TiO_2NPs. Therefore, further experimental analysis was carried out to elucidate the behavior of the luteolin in response to the toxicity of TiO_2NPs.

The intact and treated luteolin (second-order derivative) average spectra of UV-vis are presented in Fig. 3. The initial spectra (Fig. 2A) showed that the absorbance was mainly distributed in the 350–450 nm wavelength range. In contrast, the average spectra of the second-order derivative revealed that significant differences in absorbance occur at 618, 627, 632, 669, 673, and 697 nm, which can be assigned to the diversity of transformed molecules or byproducts according to their different structures. Results of the second-order derivative of UV-vis spectra preliminarily confirm the transformation of luteolin upon exposure to TiO_2NPs. The bathochromic shifts

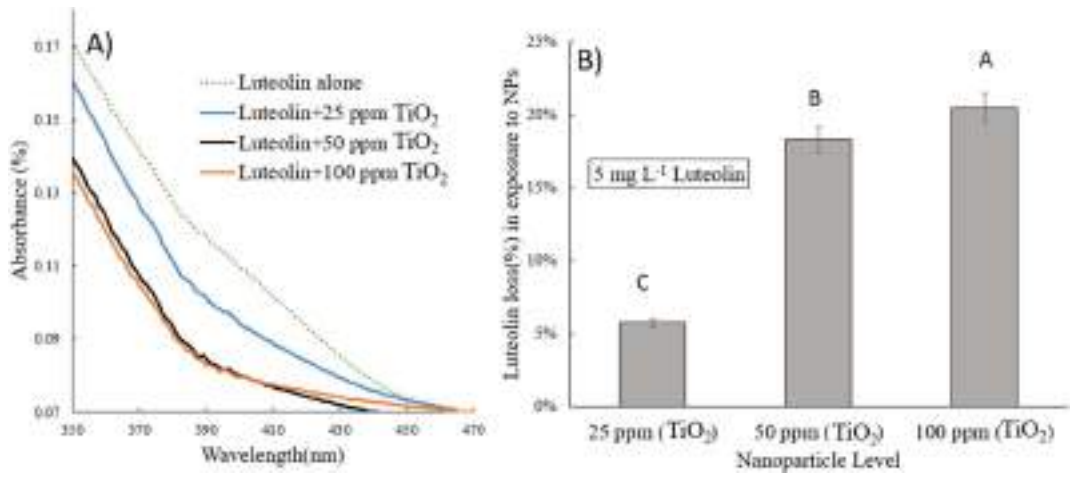

Fig. 2 (A) UV-vis spectra of luteolin systems after 48 h exposure to three levels of TiO_2NPs (25, 50 and 100 ppm) at pH 8 (A) and at pH 7.4 (B). Luteolin lost content % derived from the detected concentration of luteolin at 350 nm. Error bars signify standard deviation ($n = 3$). Different letters on top of each column indicate significant differences between luteolin lost in each treatment.

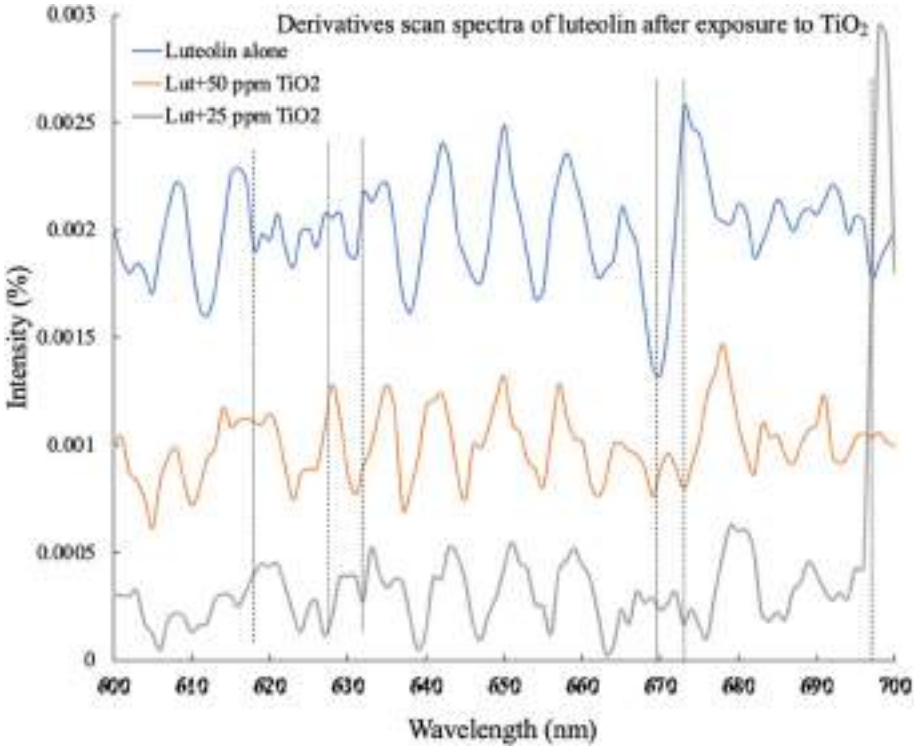

Fig. 3 The second-order derivative UV-vis spectra of free luteolin and potential transformed molecular species or chelated luteolin–titanium(IV) after exposure to either 25 or 50 ppm TiO_2NPs.

that occurred at 618 and 669 nm may indicate the formation of a complex between luteolin and dissociated Ti^{4+} ions. Furthermore, significant bathochromic shifts have been observed in ligand-to-metal charge transitions when luteolin was exposed to free lead ions.[21] According to the luteolin molecular structure, chelate formation with free metal ions could occur through two hydroxyl sites, 3′,4′-OH and 5,7-OH systems. However, the probability of chelating with free ions of the TiO_2NPs is less due to the alkaline pH (>8) that prevents the dissociation of the NPs.

The adsorption studies of organic materials onto the surface of TiO_2NPs directly affect their hydrodynamic size. Fig. 4 illustrates the structural change in the diameter of TiO_2NPs after exposure to 5 mg L^{-1} luteolin. The results show that at pH 8.1 ± 0.02, the hydrodynamic size of TiO_2NPs significantly increased from a mean size of 290 nm to a larger size of 380 nm. This observation provides strong evidence of surface adsorption of luteolin after 48 h exposure to TiO_2NPs. Previous studies have shown a similar approach to elucidate the response of plant's biomolecules in exposure to metallic oxide nanoparticles (*i.e.*, CeO_2).[37]

Effects of pH on the luteolin–TiO_2 NPs interaction

Fig. 5 displays the pH change of luteolin and three levels of TiO_2NPs before and after exposure. The pure luteolin solution was slightly alkaline, with an average pH of 8.33. However, even after 30 minutes of exposure to three dispersed TiO_2NPs levels, the luteolin solution's pH was still dominant, indicating that adsorption did not occur or only partially occurred. After 48 hours of interaction, the pH was significantly closer to the pH value that previously observed for intact TiO_2NPs. However, no significant change was observed between different treatments, but the mean pH values slightly decreased with increasing concentrations of TiO_2NPs. The reduction of pH may be explained by oxidative decarbonylation by reactive oxygen species (ROS), which promote the reduction of free H^+ ions in the solution.[38] A similar trend has been observed in the decarboxylation of mercaptobenzoic acid exposed to Ag NPs as a pH-dependent, where the shift of dissociated (R–COO–) to undissociated (R–COOH) took place until the equilibrium state.[39]

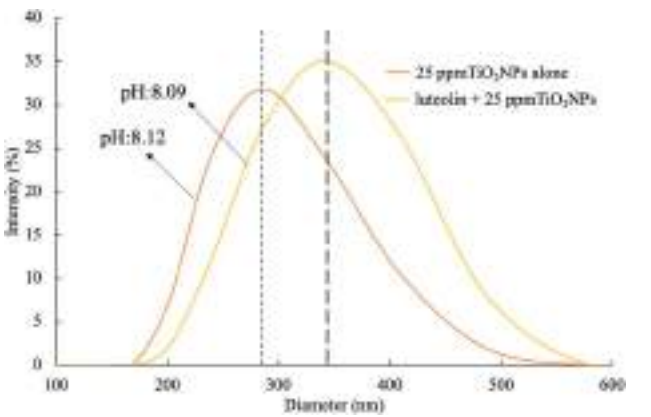

Fig. 4 Alteration of the hydrodynamic sizes of TiO_2NPs before and after 48 hours of exposure to 5 mg L^{-1} luteolin in DI water at pH 8. The plot represents the average of five scans.

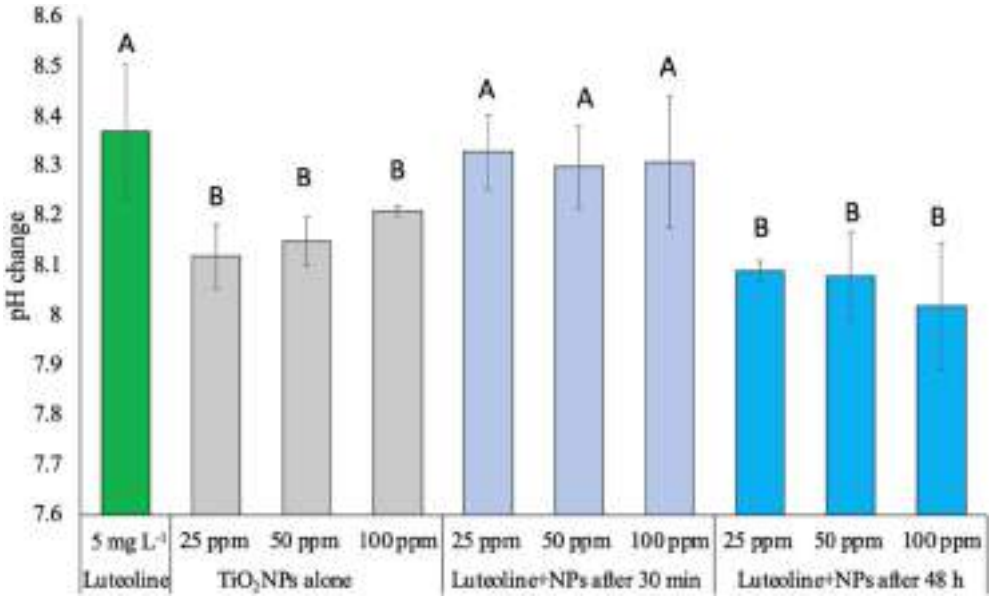

Fig. 5 The trend of pH change at pure luteolin dispersion or its mixture with different concentrations TiO_2NPs after and before adsorption. The letters above each data set represent statistical significance ($p < 0.05$). Error bars designate the standard deviation of each experiment ($n = 3$).

Further, Eshghi *et al.* 2023 suggested at lower pH values, the protonation of O–H groups of luteolin leading to higher molecular interactions,[40] cause a repulsive electrostatic force between the luteolin molecules and attraction towards negative surface charge TiO_2 NPs. This behaviour of luteolin was in a good agreement with pH studies of luteolin by Jurasekova *et al.* 2014.[41] One common chemical modification of luteolin that can occur in alkaline solutions is called the "oxidative cleavage",[41] which typically results in the opening of the C-ring and the formation of two smaller fragments. This reaction is often catalyzed by metal ions, which can generate ROS that attack the flavonoid molecule.

Structural analysis of luteolin–TiO_2 NPs interaction

According to the prepared anatase TiO_2 NPs with the facet of (101) models (Fig. 6), the TiO_2NPs surface atom (5 coordinated (Ti_{5co})) are coordinated to two O_{2co} atoms and two O_{3c} atoms of the top layer. In the (001) facet of TiO_2 NPs, each Ti_{5co} atom in the surface and top layer is coordinated to one O_{2co} and three O_{3co} atoms, respectively. The Ti_{6co} sites are accessible and considered as main active sites only in the top layer of the (101) facet, whereas these sites exist in the underneath layer and bulk region. Due to the low coordination numbers of Ti_{5co} and O_{2co} sites in (101) than Ti_{6co} and O_{3co} sites in (001), the anatase TiO_2NPs with (101) facet have more active and consequently more effective toward capturing luteolin.

On another side, by forming two OH groups surrounding the Ti^{4+} surface site in (101) facets formed through Ti–O–Ti bridges by water molecules, an H-bonding networks forms above every row of Ti^{4+} sites with luteolin on the surface-based reconstructed. These H-bond networks bridged between TiO_2NPs and luteolin molecules are expected to effectively capture luteolin, consistent with the lower coordination numbers on the (101) facets. To explore the reactive sites further, Bader charge was carried out on the surface of TiO_2. The estimated charges of the Ti_{5co} and O_{2co} active sites on the (101) and (001) surfaces are +1.58 and −0.88 e and +1.69 and −0.84 e, respectively. Notice the positive and negative values exhibit decreases and increases in valence electron numbers compared to neutral atoms, respectively.

Overall, the Ti_{5co} and O_{2co} sites on the anatase (101) facets of TiO_2NPs can serve as Lewis acid and Brønsted base sites, respectively. As a result, the lone pair electrons of the O atoms in luteolin can interact with the Lewis acidic Ti_{5co} reactive sites, enhancing the luteolin capture capacity by TiO_2NPs, as indicated by Raman spectra. Additionally, the O_{2co} sites can act as Brønsted bases and form hydroxyl groups by proton dissociation of the luteolin molecules, thereby promoting luteolin adsorption on the TiO_2NPs surfaces. It is suggested that after luteolin adsorption, its OH groups bind to a Ti_{5co} site, and the hydrogen atom can then react with an adjacent O_{2co} atom to create a new hydroxyl group.[42,43]

Raman spectral analysis of the luteolin–TiO_2 NPs interaction

To achieve a better understanding of the interaction between luteolin and TiO_2NPs, we investigated both free luteolin and the mixed treatments with TiO_2NPs by Raman spectroscopy. Raman studies that of the luteolin is often conducted in combination with metallic ions in organic solvents such as methanol,[44] while we used the water as a natural aqueous phase. The pure luteolin Raman spectra in Fig. 7 showed four distinctive peaks at 725, 1133, 1300, and 1618 cm^{-1}, which are prominent characteristic peaks. However, none of these peaks were detected when luteolin was exposed to TiO_2NPs within 48 hours. In a study on

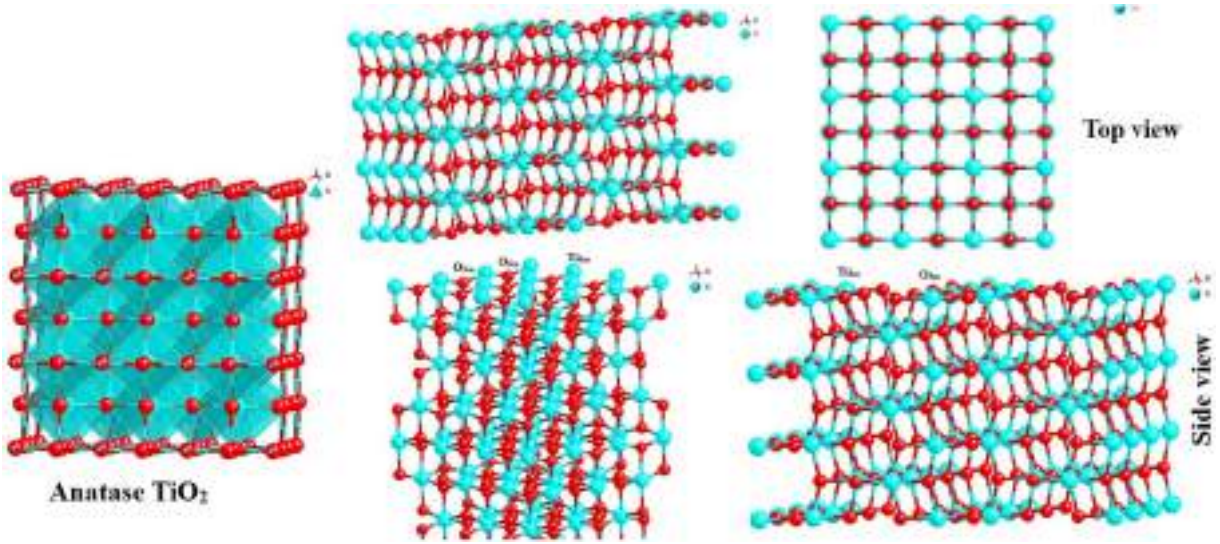

Fig. 6 Three dimensional structure of bulk and surface anatase TiO_2NPs (101) with different surface planes in both top and side views of structures.

the interaction of luteolin with Al(III) ions, Rygula *et al.* 2013 suggested that Al ions were bonded from three connecting carbons to OH and a single carbon that double bonded to oxygen.[44] However, we have not observed a potential dissociated Ti ions reaction with the luteolin. One possible interpretation is that the luteolin adsorbed onto the TiO_2NPs' surface and settled, making it undetectable by Raman spectroscopy. Coagulation and formation of larger particles, previously confirmed by DLS analysis, also contributed to this effect. The associated spectra to either level of NPs were not significantly different, and they were shown at different intensities for better presentation. The Raman spectral analysis was consistent with the observation of a pH change, indicating the strong adsorption affinity of luteolin onto the TiO_2NPs surface.

Mechanisms to capture luteolin by TiO_2 NPs

The effective capture of luteolin by TiO_2NPs (101) can be attributed to the presence of both Brønsted and Lewis acidity. In Brønsted acidic sites, TiO_2NPs (101) is capable of transferring a proton to the adsorbed luteolin molecule. This acidity is formed due to the tetrahedral coordination of Ti^{4+} or Ti^{5+} with oxygen.[45,46] The nature of the adsorbed luteolin base could be one of the reasons for the effective capture of the Brønsted acidic center of TiO_2 NPs (101). In the Lewis type of acidity, the

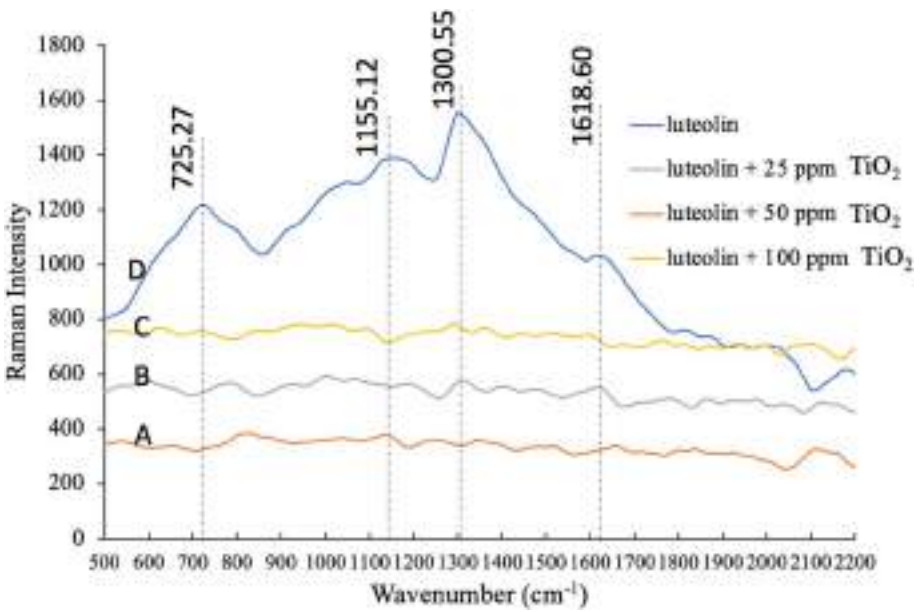

Fig. 7 Raman spectra of pure luteolin in DI water and mixture of luteolin with dispersed 25, 50 and 100 ppm TiO_2NPs after 48 hours. Four distinctive peaks at 725, 1133, 1300, and 1618 cm^{-1} are the prominent characteristic of pure luteolin in DI water.

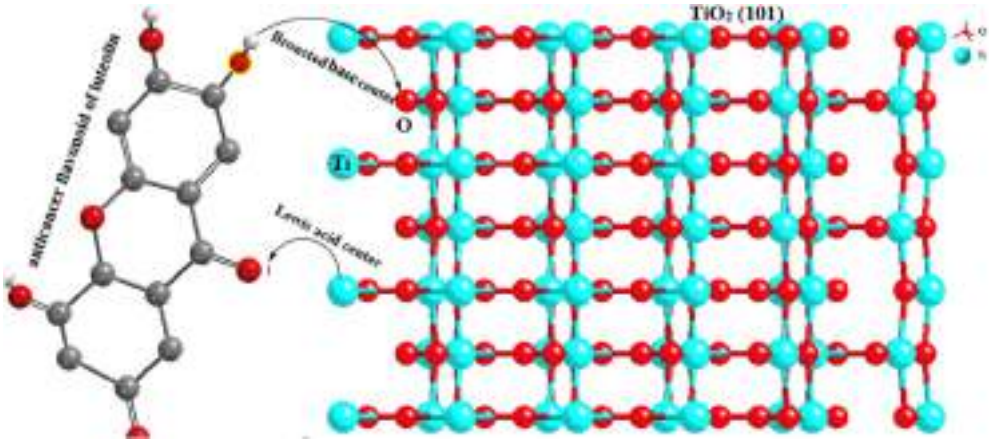

Fig. 8 Exposure pathways of luteolin OH groups with the Ti^{+} (shown by the blue atoms) from the TiO_2NPS surface on the first layer for anatase (101).

TiO_2NPs (101) plane surface accepts an electron pair from the adsorbed luteolin molecule, generating a coordinate bond. The octahedral Ti^{+4} and Ti^{+5} located on the edges of the (101) surface planes are the main Lewis centers that coordinate with luteolin.[47] Also, synergistic interactions between the Lewis and Brønsted centers with luteolin molecules may occur.[48] The schematic capture mechanisms of luteolin by TiO_2NPs (101) surface planes are illustrated in Fig. 8.

Conclusion

This study elucidated the potential transformation of luteolin anticancer flavonoids occurring at the interface of treated wastewater and anatase-TiO_2NPs (101) with extensive spectrometric measurements. The possibility of breaking the luteolin to other molecules seems to be less based on the Raman spectra analysis and second-order derivative UV-vis spectra. However, the adsorption onto the anatase TiO_2NPs (101) surface was confirmed with the DLS analysis. These results enhance the fundamental understanding of the transformation of Plant-Derived Medicinal Compounds in response to nanoparticle contamination. The results revealed the magnitude of impact is directly proportional to the level of nanoparticle contamination. Flavonoids can undergo chemical modifications in exposure to metallic oxide nanoparticles, but the specific type of modification that occurs may depend on various factors such as the pH, temperature, and the presence of other chemical species. However, it is worth noting that not all flavonoids are susceptible to this type of modification, and some may undergo other types of chemical reactions instead. Additionally, the specific conditions required for the reaction to occur may vary depending on the particular flavonoid and the intended application. Further studies are needed to investigate the impacts of crystal orientation on the molecular interaction of luteolin and other PDMC and challenging theirpersistency.

Conflicts of interest

There is no conflicts to declare.

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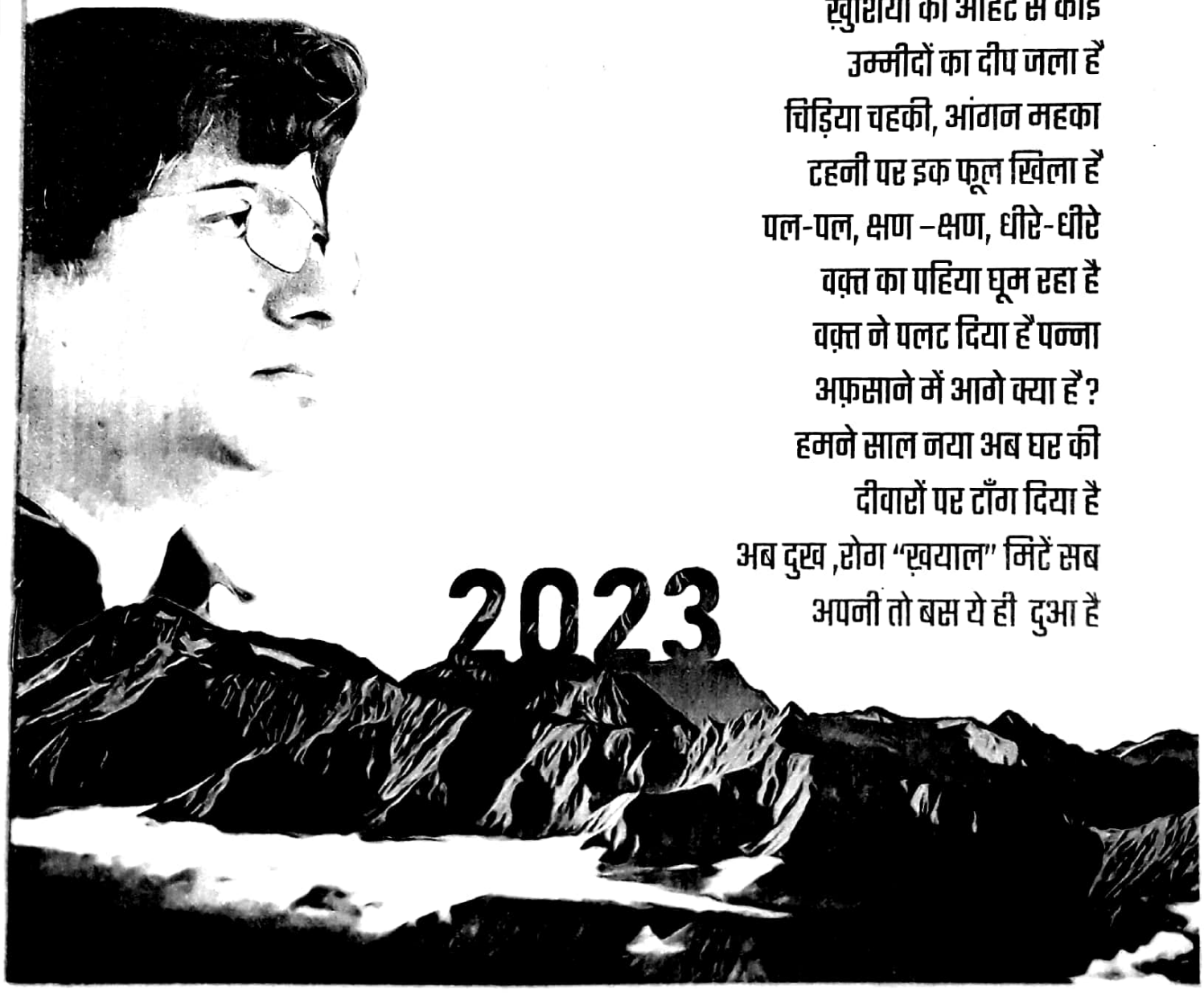
पौष-माघ वि. संवत 2079

नव निकष

हिन्दी साहित्य के नव उत्कर्ष, नव संचेतना
और नव भावबोध की प्रतिनिधि मासिकी

रेफ्रीड पीयर जर्नल, Standard Journal Abbreviation ISO4

नव दिन, नव अंकुर फूटा है
ख़ुश –आमद है, साल नया है
आने वाला कल अच्छा हो
कल का क्या, कल बीत गया है
ख़ुशियों की आहट से कोई
उम्मीदों का दीप जला है
चिड़िया चहकी, आंगन महका
टहनी पर इक फूल खिला है
पल-पल, क्षण –क्षण, धीरे-धीरे
वक़्त का पहिया घूम रहा है
वक़्त ने पलट दिया है पन्ना
अफ़साने में आगे क्या है ?
हमने साल नया अब घर की
दीवारों पर टाँग दिया है
अब दुख ,रोग "ख़याल" मिटें सब
अपनी तो बस ये ही दुआ है



नव निकष

हिन्दी साहित्य के नव उत्कर्ष, नव संचेतना और नव भावबोध की प्रतिनिधि मासिकी

वर्ष-१६, अंक-०४, जनवरी २०२३ पौष-माघ वि.संवत् २०७९

आई.एस.एस.एन-०६७५-०८२७

साहित्य चिंतन

समकालीन हिंदी कविता और भूमण्डलीकरण

• डॉ. नाज़िम शेख

वर्तमान का मानव इतना संवेदनहीन हो गया है कि न जाने वह क्या-क्या बेच डालेगा। कवि कहते हैं बाजारवादी व्यवस्था ने हमें अपनी निष्ठाएं एवं प्रतिबद्धताओं तक को बेचने पर मजबूर किया है साथ ही हमारी आत्माएं और संवेदनाएं भी बिक रही हैं। हमारे जनतंत्र को भी मानो हमने बेच दिया है। और आने वाले युग में हम न जाने क्या क्या बेचने और खरीदने वाले हैं।

वर्तमान का युग भूमण्डलीकरण का युग है। सोवियत यूनियन के विघटन के पश्चात पूरे विश्व में पूंजीवादी नई व्यवस्था को जन्म हुआ। पूंजीवाद ही मनुष्य के जीने का साधन माने जाने लगा। पूरे विश्व में खुली अर्थव्यवस्था को स्वीकारा गया। इसे ही ग्लोबलाइजेशन कहा गया, यह पूंजीवादी आर्थिक तंत्र का ही एक नया रूप था जिसे विश्व के आर्थिक विकास के रूप में स्वीकारा गया। उदारवाद के रूप में इस तंत्र ने पूरे विश्व की आर्थिक व्यवस्था को अपने कब्जे में लेना शुरू किया। बाजारवाद भी एक नई अवधारणा पूरे विश्व में पूरी गति से विकसित हुई। पूंजीवादी इस व्यवस्था ने अर्थव्यवस्था के साथ-साथ सभी देशों की सांस्कृतिक, सामाजिक तथा नैतिक मान्यताओं को भी प्रभावित किया। देशों की अपनी-अपनी पहचान मिटती गई तथा पूरी दूनिया एक 'ग्लोबल विलेज' के रूप में सामने आई। पूंजीवादी इस नई व्यवस्था से भारत अछूता नहीं रहा। देखते ही देखते हमारे देश से रीति-रिवाज, खान-पान, वेशभूषा, तीज-त्यौहार, उत्सव आदि पर इसका गंभीर रूप से प्रभाव दिखाई देने लगा। कुछ ही दिनों में हमारी सांस्कृतिक पहचान समाप्त होने लगी और पूरी दूनिया एक रूप में दिखाई देने लगी।

साहित्य समाज से प्रभावित हुए बिना नहीं रह सकता। समाज में होने वाले परिवर्तन का असर साहित्य पर भी दिखाई देने लगा। समकालीन कविता पर भी इस नए आर्थिक बदलाव, उदारवादी खुली अर्थव्यवस्था, बाजारवाद, उपभोक्तावाद का सीधा असर हुआ। इस कविता में भारतीय जन-जीवन को अत्यंत सकारात्मक रूप से अभिव्यक्ति मिली। एक ओर भूमण्डलीकरण से हो रहे फायदों को भी सकारात्मक रूप से प्रस्तुत किया गया तो दूसरी ओर इससे आम आदमी के हुए नुकसान का भी पर्दाफाश किया गया। विष्णु खरे, नरेश सक्सेना, भागवत रावत, चंद्रकांत देवताले, लीलाधर जगूडी, अशोक वाजपेयी, राजेश जोशी, मंगलेश डबराल, उदय प्रकाश, आदि कवियों नें वर्तमान की इस समस्या पर अपनी कविताओं के माध्यम से गहरी चोट की।

समकालीन हिंदी कविता में अपने आस-पास के जीवन को सूक्ष्मता से रेखांकित किया गया। आजादी के साठ वर्ष के पश्चात भी जब सामाजिक वर्गीकरण के ढांचे में कोई सुधार इन कवियों ने नहीं देखा तब भला इन कवियों की लेखनी कैसे चुप रह सकती है:

"अंधी है वह
जिह्व मगर
गूंगी नहीं है व्यवस्था
बोलती बहुत है
वाचाल
लच्छेदार, मुगध करने वाली भाषा
वाक्य शक्ति से ही तो
नियंत्रित की जाती है जनशक्ति।"

(एकांत श्रीवास्तव - नागकेसर का देश यह पृ. ५०)

राजनेताओं ने और वर्तमान की बनी व्यवस्था ने भूमण्डलीकरण को और बढ़ावा दिया। इस का गलत अर्थ में प्रचार और प्रसार किया। समकालीन हिंदी कविता में वर्तमान समाज की सही संवेदना को भी अभिव्यक्त किया गया। तत्कालीन परिस्थिति का ब्योरेवार चित्रांकन इसमें दिखाई देता है। भागवत रावत लिखते हैं:

"जब से भूमण्डल नहीं रहा भौगोलिक

चढ़ गया है भूमण्डलीकरण का बुखार
जब से गायब होना शुरू हुई उदारता
फैला प्लेग की तरह उदारतावाद
जब से उजड़ गये गांवो-कस्बों और शहरों के
खुले मैदानों के बाजार
घर-घर में घुस गया नकाबपोश
बाजारवाद।"

(भागवत रावत-देश एक राग है- पृ. २३)

कवि वैश्वीकरण को समाज का बुखार मानते हैं जो कि आर्थिक साम्राज्यवाद के ताप का परिणाम है। इसी के कारण हमारे देश के गांव, कस्बे और शहर उजड़ गए हैं। हर घर में आज बाजारवाद दिखाई देने लगा है, मानव भी मानो एक प्रोडक्ट ही बन कर रह गया है। रामप्रकाश कुशवाह लिखते हैं:

"बाजार में आदमी बिकता ही है अपने लिए
या फिर बचाने के लिए अपने को
अपनों की जगह .....
कभी कभी तो वह सपने खरीदने के लिए
सपने बेच रहा होता है।"

(रामप्रकाश कुशवाह- हँस-मई २०१० पृ. ५३)

वर्तमान की इस बाजारवादी व्यवस्था के कारण मनुष्य की सोच भी बाजारू बन गई है। वर्तमान का मनुष्य बाजार में मानों बिकता जा रहा है। वह अपने-आप को बेचकर भी अपने को बचाए रखने का प्रयास कर रहा है। उसके लोभ ने उसे बाजारू बना दिया है। संवेदनाएं मानों खत्म हो चुकी हैं। मदन कश्यप लिखते हैं -

"खरीद फरोख्त के इस युग में
निष्ठाएं और प्रतिबध्दताएं ही नहीं
आत्माएं और संवेदनाएं भी बिक रही हैं
सस्ते में बिक गई जम्हूरियत
हम अब और क्या-क्या बेचेंगे
क्या-क्या खरीदेंगे।"

(मदन कश्यप- नीम रोशनी में निर्बल पखंडी पृ. ७७)

वर्तमान का मानव इतना संवेदनहीन हो गया है कि न जाने वह क्या-क्या बेच डालेगा। कवि कहते है बाजारवादी व्यवस्था ने हमें अपनी निष्ठाएं एवं प्रतिबद्धताओं को तक बेचने पर मजबूर किया है साथ ही हमारी आत्माएं और संवेदनाए भी बिक रही है। हमारे जनतंत्र को भी मानों हमने बेच दिया है। और आनेवाले युग में हम न जाने क्या क्या बेचने और खरीदने वाले हैं। कवि ने मनुष्य की उस प्रवृत्ति को उद्‌घाटित किया है जिसमें सही अर्थ में वह बाजारवादी बन गया है। दुनिया मानों गांव में सिमट गई है निर्मला गर्ग लिखती हैं -

"अब जब कि
दुनिया एक गांव बनने जा रही है
और एक विश्व बाजार है जिसमें
हम सब बिला जाएंगे
कितना जोखिम भरा शब्द हो गया है भरोसा
और उससे भी बड़ा जोखिम है उसे बचाना।"

(निर्मला गर्ग-सफर के लिए रसद)

भूमण्डलीकरण के कारण जन-सामान्य की सोच में तेजी से परिवर्तन आ रहा है। मनुष्य की भावनाएं एवं मूल्य भी इसके गिरफ्त में हैं। पूरी दुनिया का गांव में तबदील होना यह मनुष्य के छोटे बनने की निशानी है। आज के इस युग में कोई किसी पर भरोसा नहीं कर रहा है हर एक अपने आप को बचाने की फिक्र में है। निर्मला गर्ग की यह पंक्तियाँ वर्तमान भारतीय समाज के यथार्थ स्थिति को रेखांकित करती है।

निष्कर्षतः कहा जा सकता है कि भूमण्डलीकरण के इस युग में सामाजिक अवमूल्यन, संवेदनहीनता निरंतर बढती जा रही है। मनुष्य की संवेदनाएं ही खत्म होती जा रही हैं, मानवीय रिश्तों की ऊष्मा ही ठंडी पडने लगी हैं तथा पूंजीवाद और उदारीकरण के बीच वर्तमान का मानव पिस रहा है। एक ओर बाजारवाद की चकाचौंध भरी दुनिया है तो दूसरी ओर दो वक्त की रोटी को तड़पता, अपने-आप को बेचने पर तुला मनुष्य दिखाई दे रहा है। समकालीन हिंदी कवियों ने समाज के इन दोनों पक्षों का चित्रांकन अत्यंत सटीकता से अभिव्यत किया है। बाजारवाद के इस दौर में अपने आप को सभी संकटों से बचाते मनुष्य का, उसकी जिजीविषा का, उसके जीने की जद्‌दोजहद का सही और सूक्ष्म चित्र इस कविता में अंकित हुआ है। सामाजिक विषमताएँ, राजनीतिक हथकंडे, महानगर की भयानकता, युवकों की बेकारी, रोज बढ़ती सांप्रदायिकता, धर्मांधता आदि का पर्दाफाश इन कवियों ने तिखे व्यंग्य के माध्यम से किया। भूमण्डलीकरण की विद्रूपता को इन कवियों ने अत्यंत ईमानदारी से अभिव्यक्त किया है। कहा जा सकता है कि समकालीन हिंदी कविता समाज मे एक नई उम्मीद, नया विश्वास, मनुष्यता और मानवीय प्रेम को नए सिरे से उजागर करती है। ❑

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समीचीन

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पीयर रिव्यूड व यू. जी. सी. केयर लिस्ट में सम्मिलित जर्नल

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अपने तई

[illegible] के बाद मैकाले भक्तों ने यह [illegible] शिक्षा सिर्फ अंग्रेजी में ही दी [illegible] के अनुसार तकनीक एवं [illegible] की पढ़ाई भारतीय भाषाओं में [illegible] शुरू कर दिया। मध्यप्रदेश में [illegible] और उसे लागू करने के लिए पाठ्य[illegible] महत्वपूर्ण कदम माना जा रहा है। [illegible] ने भी बारह से अधिक भारतीय भाषा[illegible] इसमें भारत सरकार की दृढ़ राजनीतिक इच्छा [illegible] हिंदीभाषी राज्यों में हिन्दी लादे जाने का डर दिख[illegible] हिन्दी-विरोध का यह सिलसिला बहु[illegible] हिन्दी विरोधी राजनीति की है, उन्होंने जाने-[illegible] क्योंकि हिन्दी का विरोध करते हुए [illegible] हमारा विरोध नहीं है लेकिन उसके [illegible]

[illegible] तथ्य भी उल्लेखनीय है कि [illegible] शिक्षा का माध्यम बनाने का संकल्प व्यक्त किया [illegible] एवं स्व-पहचान की दिशाएँ उद्घाटित [illegible] एवं राष्ट्रीय सरोकारों से जोड़ते [illegible] सांस्कृतिक संरचना के अनुरूप [illegible] ने यदि अपनी राजनीतिक [illegible] में उलझाना नहीं चाहि[illegible] भाषाओं के विकास का मार्ग [illegible] कि हिन्दी आज संपूर्ण [illegible] गयी है। राष्ट्रीय स्तर पर [illegible] हिन्दी-विरोध की राजनीति [illegible] से वंचित हो करेगी। सभी [illegible]

सन् 2011 के बाद की लघुकथाओं में राजनीतिक विमर्श

प्रो.(डॉ.) नाजिम शेख

साठोत्तरी कालखंड में लघुकथा का प्रारम्भ हुआ लेकिन गत चार दशकों में लघुकथा का अत्यंत गति से विकास हुआ। 21वीं सदी के दूसरे दशक में लघुकथा अत्यंत लोकप्रिय विधा के रूप में उभर कर आई। जितनी लोकप्रियता इस विधा को अल्पकाल में प्राप्त हुई, शायद ही अन्य किसी विधा को मिली हो। आज लघुकथा यह विधा अन्य विधाओं की पंक्ति में आकर बैठ गई है। वर्तमान की एक भी साहित्यिक पत्रिका ऐसी न होगी जिसमें लघुकथा न हो। सभी साहित्यिक प्रतिष्ठित पत्र-पत्रिकाओं में लघुकथाओं को देखा जा सकता है। सारिका जैसी प्रतिष्ठित पत्रिका ने लघुकथाओं को मात्र अपने अंकों में स्थान ही नहीं दिया बल्कि लघुकथाओं का विशेषांक भी निकाला है। लघुकथाओं के अल्पकाल में लोकप्रिय होने का एक कारण यह भी रहा कि लघुकथा आम आदमी के जीवन से जुड़ी हुई है। आम आदमी के वर्तमान की सभी समस्या भी को लघुकथाओं में अभिव्यक्त किया गया है।

आम आदमी की समस्याओं के साथ राजनेताओं का दोगलापन, भ्रष्ट राजनीति, व्यवस्था के विरुद्ध विद्रोह, प्रजातंत्र की असफलता आदि विषयों का पदार्फाश किया गया है। इन लघुकथाओं में राजनीति से सम्बन्धित सभी विषयों का विस्तार से विमर्श हुआ। देश की राजनीतिक सामाजिक आदि क्षेत्रों में फैली अराजकता और अस्थिरता का सीधा प्रभाव इन लघुकथाओं पर हुआ। आजादी के पश्चात देश के आम आदमी ने बदलाव की कामना की थी जो पूरी न हो सकी। जनतंत्र, व्यवस्था, चुनाव, संविधान जैसे शब्द खोखले दिखाई देने लगे। जनतंत्र से जनता को सुखी बनाने का उद्देश्य कोसों दूर रहा। जनतंत्र का मात्र राजनीतिक विकास हुआ सामाजिक नहीं। लघुकथाओं में जनतंत्र के असली रूप का पदार्फाश हुआ है। इन लघुकथाकारों ने जब प्रजातंत्र के बुनियादी दोषों को देखा तब उन्होंने उसके असली चेहरे को बेनकाब किया। उषा जैन शीरीं 'लिखती हैं सी दिस इज इंडिया नो डिसीप्लिन नो कल्चर और करप्शन की तो इंतिहा है कि फ्री के पान-सिगरेट से लेकर लाखों की दलाली।' (उषा जैन शीरीं - दो सो ग्यारह लघु कथाएं- पृ. ८२)

वर्तमान के इन रचनाकारों ने तत्कालीन राजनीति का सीधा पोस्टमार्टम किया। इन लघुकथाकारों ने सत्ताधारियों के षड्यंत्र को नजदीक से देखा था। वर्तमान की व्यवस्था में राजनेता, पुलिस, अधिकारी सभी अपना कर्तव्य निभाने में चूक कर रहे हैं, इसका इन लघुकथाकारों को सही पहचान है। राजनेता गरीबी हटाओ के नारे तो देते हैं लेकिन आम जनता की गरीबी को नहीं देखते बल्कि अपनी खुद की गरीबी हटाने में ही लगे रहते हैं। डॉ. पुरुषोत्तम छगाणी लिखते हैं 'फिर वे धीमे स्वर में बोले, अभी तक मेरी गरीबी कहाँ हटी है, उसे भी हटाना है

बाद में आप सब की बारी आयेगी। गरीबी हटेगी जरूर मेरा बाद जोड़ माफी मांगता हूँ।' (डॉ. पुरुषोत्तम छगाणी - मधुमती - जुल

आज के राजनेताओं का लक्ष्य राष्ट्रनिर्माण और जनहित न नेताओं ने अपने आप को लोगों तक पहुंचने के सभी साधन द लोकहितकारी होना था वह सिर्फ अपने हित को सोचते रहे हैं मात्र चुनाव तक सीमित रहती है। डॉ. पुरुषोत्तम छगाणी चुनाव लिखते हैं, 'आम चुनाव में विधायक हेतु पार्टी का टिकट घ चुनाव में गुरूजी के इशारे पर एक बागी उम्मेदवार ने परा छोलू से ढोलू हो गया था।' (डॉ. पुरुषोत्तम छगाणी - मधुमती

वर्तमान की राजनीति में राजनेताओं का लक्ष्य मात्र चुना नेहरू के काल में राजनीति का अर्थ समाजनीति हुआ करता आम आदमी के लिए कोई जगह नहीं है। इसीकारण वर्तमा और व्यवस्था के विरोध में अपने विचारों को प्रकट किया है एक दूसरे से लड़वाते हैं और अपना फायदा करवाते हैं। वि बड़ा हुआ, तब उसे समझ में आया कि धर्म, जाति और राज जब लगता है कि झुंड आपस में घुल-मिल रहे हैं, तो वे खा (विभांशु केशव - वागर्थ, मई २०१८ - पृ. २८)

इन वाक्यों से राजनेताओं की चरित्रहीनता, दोगलापन वर्तमान सभी समस्याओं की जड़ विचारहीन राजनेता हैं। ज आम जनता के प्रति बेफिक्र दिखाई देते हैं। आम आदमी और उसकी ओर देखनेवाला कोई नहीं है। उमेश कुमा आजाद भारत के आम परिवार का चित्रण करते लिख बच्चे को -पिता का कोई अता-पता है नहीं और सरकार लगेंगे। तब तक यह जिंदा भी बचेगा या नहीं। सुनकर माँ जाऊँ।' (उमेश कुमार चौरसिया - मधुमती - जून २०१६

निष्कर्षतः कहा जा सकता है कि वर्तमान लघुक अंतरंग से अभिव्यक्त हुआ है। वर्तमान राजनीति का य है। समकालीन भ्रष्ट राजनीति का चित्रण इन कथाकारों इन कथाकारों को राजनीति की है उतनी शायद ही अ राजनीतिक विडम्बना को इन कथाकारों ने बड़े ही समकालीन राजनीति के असली तथा अमानवीय चेहरे

बाद में आप सब की बारी आयेगी। गरीबी हटेगी जरूर मेरा वादा है लेकिन अभी फिलहाल हाथ जोड़ माफी मांगता हूँ।' (डॉ. पुरुषोत्तम छगाणी - मधुमती - जुलाई २०१६ पृ. १४३)

आज के राजनेताओं का लक्ष्य राष्ट्रनिर्माण और जनहित कतई नहीं है। स्वार्थ के चलते इन नेताओं ने अपने आप को लोगों तक पहुंचने के सभी साधन ढूंढ लिए हैं। जिन राजनेताओं को लोकहितकारी होना था वह सिर्फ अपने हित को सोचते रहे हैं। इन सभी राजनेताओं की नजर मात्र चुनाव तक सीमित रहती है। डॉ. पुरुषोत्तम छगाणी चुनाव की घटिया राजनीति दिखाते हुए लिखते हैं, 'आम चुनाव में विधायक हेतु पार्टी का टिकट भी उसे नहीं दिया गया। सरपंच के चुनाव में गुरूजी के इशारे पर एक बागी उम्मेदवार ने उसे पराजित कर दिया था। अब वह वापस छोलू से ढोलू हो गया था।' (डॉ. पुरुषोत्तम छगाणी - मधुमती - जुलाई २०१६ - पृ. १४३)

वर्तमान की राजनीति में राजनेताओं का लक्ष्य मात्र चुनाव जीतना रहा है। कभी गांधी और नेहरू के काल में राजनीति का अर्थ समाजनीति हुआ करता था लेकिन वर्तमान की राजनीति में आम आदमी के लिए कोई जगह नहीं है। इसीकारण वर्तमान के लघुकथाकारों ने राजनेताओं और व्यवस्था के विरोध में अपने विचारों को प्रकट किया है। राजनेता धर्म के नाम पर लोगों को एक दूसरे से लड़वाते हैं और अपना फायदा करवाते हैं। विभांशु केशव लिखते हैं -'बच्चा जब बड़ा हुआ, तब उसे समझ में आया कि धर्म, जाति और राजनीति के नामपर झुंड चरानेवालों को जब लगता है कि झुंड आपस में घुल-मिल रहे हैं, तो वे खाने के लिए कोई तुकड़ा फेंक देते हैं।' (विभांशु केशव - वागर्थ, मई २०१८ - पृ. २८)

इन वाक्यों से राजनेताओं की चरित्रहीनता, दोगलापन, भ्रष्टाचारी नीति का पता चलता है। वर्तमान सभी समस्याओं की जड़ विचारहीन राजनेता हैं। जनकल्याण का मुखौटा ओढ़े राजनेता आम जनता के प्रति बेफिक्र दिखाई देते हैं। आम आदमी की हालत बदसेबतर होती जा रही है और उसकी ओर देखनेवाला कोई नहीं है। उमेश कुमार चौरसिया अपनी एक लघुकथा में आजाद भारत के आम परिवार का चित्रण करते हुए लिखते हैं - 'मांजी, कब तक बहलाओगी बच्चे को -पिता का कोई अता-पता है नहीं और सरकारी सहायता आने में अभी दो दिन और लगेंगे। तब तक यह जिंदा भी बचेगा या नहीं। सुनकर माँ चीत्कार उठी - तो क्या करूँ मैं कहाँ जाऊँ।' (उमेश कुमार चौरसिया - मधुमती - जून २०१६ - पृ. १२५)

निष्कर्षतः कहा जा सकता है कि वर्तमान लघुकथाओं में राजनीति का चित्रण अत्यंत अंतरंग से अभिव्यक्त हुआ है। वर्तमान राजनीति का यथार्थ चित्रण इन लघुकथाकारों ने किया है। समकालीन भ्रष्ट राजनीति का चित्रण इन कथाकारों ने किया है। जितनी साफ-सुथरी समझ इन कथाकारों को राजनीति की है उतनी शायद ही और किसी विषय की होगी। आज की राजनीतिक विडम्बना को इन कथाकारों ने बड़े ही सूक्ष्मता के साथ अभिव्यक्त किया है। समकालीन राजनीति के असली तथा अमानवीय चेहरे को इन कथाकारों ने बेनकाब किया है।

राजनीति की सही समीक्षा इन लघुकथाओं में दिखाई देती है। इन कथाकारों ने [illegible] राजनेताओं पर व्यंग्य कसकर उनमें निहित दोषों को दूर करने की मांग की है। समाज को वैचारिक उर्जा प्रदान करने का महत्वपूर्ण कार्य इन कथाकारों की कथाओं से [illegible] इन लघुकथाओं में शोषण प्रवृत्ति का विरोध और विषमताओं का विश्लेषण हुआ है। यह लघुकथाएं दलितों, शोषितों, किसानों और मजदूरों के पास में खड़ी होकर व्यवस्था, प्रशासन और वर्तमान राजनेताओं का विरोध करती हैं। इन लघुकथाकारों ने एक ऐसे सुखमय देश की कामना की थी, जिसमें देश का आम आदमी सुखी हो जाए, कोई भूखा न रहे, हर एक शोषण से मुक्त हो जाए। यही इन लघुकथाकारों के कथाओं का प्रमुख उद्देश्य है।

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