iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** V **Month of publication:** May 2023

DOI: https://doi.org/10.22214/ijraset.2023.52172

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue V May 2023- Available at www.ijraset.com

An Investigative Study on the Awareness of BioDiesel and its Sustainable Impact on Environment in the City of Bengaluru

Mr. Vivek Gupta[1], Dr. Richa Tiwari[2], Mohammed Danish[3], Nayan Agarwal[4], Prithvi Raj[5], Pramoth. S[6]

Abstract: ***The use of fossil fuels has been a major cause of environmental pollution. This has led to the development of alternative energy sources such as biodiesel, which are considered a more sustainable and environmentally friendly option. However, awareness and acceptance of biodiesel as a fuel is still limited in many parts of the world. The aim of this study is to investigate the awareness of biodiesel and its environmental impact in Bengaluru, India. Literary basis: Previous studies have highlighted the benefits of biodiesel as a sustainable fuel source.***
However, adoption and awareness of biodiesel varies by region and country. Research onawareness and adoption of biodiesel in India is limited, especially in urban areas such as Bengaluru. Purpose: The main objective of this study is to investigate the level of awareness about biodiesel and its impact on the environment in Bengaluru. The purpose of the research is also to find out the factors that influence the adoption of biodiesel as a fuel. Analytical method: This study uses a descriptive research design to collect data from individuals in Bengaluru. Data collection methods include surveys and interviews to assess awareness of biodiesel and factors influencing its adoption. Observations: The results of this study indicate that awareness of biodiesel and its potential environmental impact in Bengaluru is low. The study also identified several barriers to biodiesel adoption, such as lack of availability, cost and lack of knowledge. Future Dimension: The study highlights the need for further research to understand the social and environmental impacts of biodiesel. The findings of this study can be used to develop strategies to increase awareness and use of biodiesel in Bengaluru and other urban areas. In summary, it can be stated that the scope of this topic is wide and it has the potential to influence variousaspects of society, from health care to education

I. INTRODUCTION

Growing concern about the environmental impact of human activity has led to more and more sustainable and green energy options. In this regard, biodiesel has become a promising solutiondue to its renewable nature and cleaner burning characteristics. Biodiesel is a fuel made from natural resources such as vegetable oils, animal fats and recycled cooking oils. It is a sustainable and environmentally friendly alternative to traditional fossil fuels because it produces fewer greenhouse gasses and particulate emissions that are harmful to human health and the environment.

1) Definition of keywords Green energy means energy produced from natural renewable resources with minimal environmental impact. These sources include solar, wind, hydro and geothermal energy. The use of green energy is considered an important step towards reducing greenhouse gas emissions and combating climate change. Sustainability refers to the ability to maintain or continue something without consuming or harming natural resources. In the contextof energy, sustainable energy is obtained from sources that can be replenished naturally and cannot be consumed. The use of sustainable energy sources is important to reduce the environmental impact of energy consumption. Biodiesel is a renewable and cleaner burning fuel made from natural resources such as vegetable oils, animal fats and recycled cooking oils. It is analternative to traditional diesel fuel and produces fewer greenhouse gasses and particles, making it a more sustainable and environmentally friendly alternative.

2) Importance of Biodiesel ,The use of sustainable and green energy alternatives, such as biodiesel, has become an increasingly important topic in recent years due to the environmental and health effects of traditional fossil fuels. Fossil fuel is a major contributor to greenhouse gasses, which are the main cause of climate change. In addition, regular diesel also produces particles that can cause breathing problems and other health problems. The importance of the subject is further emphasized by the growing concern of individuals and organizations about the environmental impact of their energy consumption. Many are looking for alternatives to traditional fossil fuels and are exploring sustainable and green energy options such as biodiesel.

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3) People's perception of biodiesel and its use in Bangalore People's understanding of biodieselin Bangalore is still evolving, but interest and awareness of its benefits seems to be growing. Many people and organizations are becoming more aware of the impact of their energy consumption on the environment and are exploring ways to reduce their carbon footprint. In terms of applicability, biodiesel has the potential for widespread use in Bangalore given its largepopulation and growing energy demand. The city's location in a tropical climate with abundant plant resources also makes it a suitable location for biodiesel production. Due to its renewable and ecological properties, biodiesel can help reduce the environmental impact of energyconsumption and improve the health of Bangaloreans.

II. LITERATURE REVIEW

1) Awareness of biodiesel in Bangalore Several studies have been conducted in Bangalore to assess awareness of biodiesel. The study by Nithyanandan and Sivakumar(2015) planned to analyze the awareness and perceptions of the people of Bangalore about biodiesel. The study found that while awareness of biodiesel was moderate, understanding of its benefits and uses was lacking. Another study by Aravindi and Suresh(2016) attempted to assess the awareness and willingness of commercial vehicle drivers to use biodiesel in Bangalore. The study found that while awareness of biodiesel was high, there was a lack of willingness to switch to biodiesel due to availability and cost issues. Keshavan et al. (2017), the authors analyzed the awareness and understanding of biodiesel among students in Bangalore. The study found that while awareness of biodiesel was moderate, understanding of its benefits and uses was lacking. The study also concluded that more education and information programs are needed to promote theuse of biodiesel.
2) Sustainable Impact of Biodiesel in Bangalore Studies have also been conducted to assess the sustainability impact of biodiesel in Bangalore. Muthu et al. (2015) attemptedto assess the environmental impact of biodiesel production from waste cooking oil in Bangalore. The study concluded that biodiesel produced from waste cooking oil had alower environmental impact than diesel oil in terms of greenhouse gas emissions and energy consumption. Another study by Dasappa et al. (2016) attempted to assess the potential of biodiesel production from non-edible oils in Bangalore. The study found thatnon-edible oils such as Jatropha and Karanja have potential for large-scale biodiesel production in Bangalore, which can have a significant impact on reducing greenhouse gasses and improving air quality. According to Singh et al. (2019), the authors analyzed the potential of biodiesel production from microalgae in Bangalore. The study found thatmicroalgae has the potential to be a sustainable and renewable source of biodiesel production in Bangalore with a lower environmental impact than conventional diesel.
3) Research Objectives The aim of this study is to find out the Sustainable Impact on Environment and understanding about biodiesel among the people of Bangalore and to assess its potential as a sustainable and environmentally friendly source of energy. Thespecific objectives of the study are: To assess the awareness of the people of Bangalore about biodiesel. To find out the factors that influence the perception and readiness for use of biodiesel. To assess the sustainable environmental impact of biodiesel in Bangalore. Toexplore the potential for large-scale production of biodiesel from non-edible oils and waste edible oils in Bangalore.

III. RESEARCH METHODOLOGY

Descriptive research methodology is research that describes and measures a phenomenon or situation. In this study, we use a descriptive research methodology to examine the awareness of biodiesel and its sustainable environmental impact in Bengaluru. The objective of this study is to provide a better understanding of the level of awareness about biodiesel and its potential environmental impact and to identify the factors influencing the use of biodiesel in Bengaluru.

1) *Research Method:* The sampling technique used in this study is non-probability purposive sampling or snowball sampling. The sample was drawn from the researcher's network of friends only in Bangalore, India. This approach allows us to gain a comprehensive understanding of biodiesel and its sustainable environmental impact in Bengaluru. Study design: The research design of this study is a survey design. The survey includes a closed-ended questionnaire to collect both quantitative and qualitative data. The purpose of the study is to collect information about the level of awareness about biodiesel, potential environmental impacts of biodiesel and factors affecting the use of biodiesel in Bengaluru.
2) *Data Collection:* The data collection method of this study is a self-administered online survey. The survey will be shared on social media and by email, and participants will be asked to complete the questionnaire online. It takes about 10 minutes to complete the survey. Data analysis: The information gathered from the research is analyzed with descriptive statistics, such as mean, median and standard deviation, to describe the popularity of biodiesel and the potential environmental impacts of biodiesel.

3) *Ethical Considerations:* This study follows ethical guidelines for human research. Participantsare informed about the purpose of the study, the nature of the data collected and their rights as participants. Participants are informed that their participation is voluntary and that they can withdraw at any time. Confidentiality and anonymity are ensured by assigning a unique identification number to each participant.

A. *Sampling Technique*

The sampling technique used in this study is non-probability purposive sampling or snowballsampling. The sample was drawn from the researcher's network of friends only in Bangalore, India. A total of 116 participants took part in the study. This sampling technique was chosen because it allowed the researcher to target a specific group of people involved in the introductionof biodiesel in the city. Non-probability sampling is often used in qualitative research because it allows researchers to select participants based on certain criteria or characteristics. On the other hand, the snowball sampling technique allowed the researcher to contact other potential participants through referrals from existing participants. This method is particularly useful when the target group is difficult to reach using traditional sampling methods. Although the sample sizeof this study is relatively small, it is suitable for a descriptive study that aims to find out the awareness of biodiesel and its sustainable effects on the environment in a certain location. Overall,the non-probability purposive sampling or snowball sampling technique used in this study was appropriate for the research objectives and allowed valuable information to be collected from thetarget population.

IV. DATA ANALYSIS & INTERPRETATION

A. *Effects of Traffic*

As per the findings, reducing the climate effects of traffic is an urgent need that requires immediate action. Fortunately, biodiesel is an available and efficient alternative fuel source thatcan significantly mitigate the negative effects of traditional fossil fuels. By adopting biodiesel, we can reduce greenhouse gas emissions and air pollution, which helps create a healthier and more sustainable environment for current and future generations. In addition, biodiesel production supports the local economy and promotes energy independence, which makes it a promising solution to various environmental and social challenges. It is therefore important to raise awareness and encourage the widespread availability and use of biodiesel as a critical stepin building a more sustainable and just future.

B. *Cost Factor of Biodiesel*

The data showed that although paying more for biodiesel is optional, it is a necessary step toreduce greenhouse gas emissions. By choosing to purchase biodiesel, consumers have the opportunity to support sustainable and environmentally friendly practices that can have a significant impact on reducing our carbon footprint. The need to reduce greenhouse gas emissions cannot be overemphasized either, as climate change is a major threat to our planet andfuture generations. Therefore, the optional decision to pay more for biodiesel can encourage the necessary actions to mitigate the effects of climate change and create a more sustainable future. Biodiesel as an alternative

As responsible consumers, people are more willing to consider the use of biodiesel as a reasonable alternative to traditional fossil fuels, but it is important to consider its availability in their city. It is the responsibility of the state and private sector parties to ensure that biodiesel fuel is readily available to consumers, for example by building gas stations or encouraging companies to use sustainable energy sources. The availability of biodiesel in the city is crucial for consumers to switch to a more environmentally friendly fuel. It is therefore important that the availability of biodiesel is prioritized as part of our efforts to reduce our carbon footprint and combat climate change.

C. *Effect of Biodiesel on Carbon Emission in the Environment*

As responsible citizens, we firmly believe that using biodiesel is a necessary option to reduce ourcarbon footprint and combat the negative effects of climate change. The use of biodiesel made from renewable natural resources can significantly reduce carbon dioxide emissions, as it produces much less greenhouse gasses than traditional fossil fuels. By choosing biodiesel, we take responsibility for our environmental impact and take active steps to create a sustainable future for ourselves and future generations. It is our duty to prioritize the use of environmentally friendly fuels and reduce our carbon footprint, and biodiesel is a reasonable choice here.

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D. Effect of Biodiesel on Air Pollution

From the results, it can be concluded that in the search for a clean and healthy environment, it isnecessary to investigate alternative fuel sources, such as biodiesel, which can help mitigate the negative effects of traditional fossil fuels. Biodiesel is a sustainable and renewable fuel source that produces fewer harmful pollutants and greenhouse gasses, helping to reduce air pollution and combat climate change. The use of biodiesel also supports sustainable agriculture and local economies, further promoting environmental and social sustainability. Therefore, the introduction of biodiesel as an alternative fuel is necessary not only to protect our environment,but also to promote a more sustainable and just society that values the well-being of both peopleand the planet.

E. Interest To Switch To A Biodiesel Power Plant Vehicle

From the data it has been found out that in the future, people would love to try driving a biodiesel powered vehicle, provided their availability becomes more widespread, as it is a necessary step towards creating a more sustainable environment. As responsible individuals, weunderstand the importance of reducing our carbon footprint and minimizing the negative impact of our actions on the environment. Biodiesel presents a viable alternative to traditional fossil fuels, which emit harmful greenhouse gasses, and the widespread availability of biodiesel-powered vehicles would make it easier for individuals to make environmentally conscious choices. Therefore, it is necessary for initiatives to be taken to increase the availability of biodiesel-powered vehicles, as it can contribute to a more sustainable future for our planet

F. Stability And Reliability Of Biodiesel Powered Vehicles

As per the findings, using biodiesel can improve the performance of some types of automobilesin addition to being a responsible decision that can help lessen our reliance on fossil fuels.

Because it is more lubricious than regular diesel, biodiesel can increase engine efficiency and lessen wear and tear. Moreover, biodiesel burns more quickly and effectively due to its higher cetane rating, which also contributes to smoother engine operation and potential improvementsin fuel efficiency. By choosing to use biodiesel, we are possibly enhancing the performance ofour vehicles as well as accepting responsibility for our impact on the environment.

G. Perception on Biodiesel

After learning how important it is to lessen our carbon footprints, people think it is their personalobligation to alter the way they use vehicles. As per the data it has been found that we can reducegreenhouse gas emissions and support a cleaner, healthier environment by making deliberate decisions like carpooling, using the bus, and choosing low-emission automobiles. Making these changes is now easier than ever thanks to government initiatives to cut carbon emissions and promote sustainable transportation options. Additionally, we can guarantee that our mobility demands are addressed while still minimizing our environmental effect by prioritizing performance and selecting vehicles that are both efficient and dependable.

H. Why Should the awareness on Biodiesel Increase ?

From the studies carried out, it was concluded that biodiesel is a clean-burning fuel made fromrenewable sources such as vegetable oils and animal fats, which significantly reduces carbon dioxide emissions and air pollution compared to traditional petroleum-based diesel fuel.

Widespread use of biodiesel can reduce our dependence on fossil fuels and reduce greenhousegas emissions, thereby mitigating the effects of climate change. It is very important to raise public awareness of the benefits of biodiesel and promote its use as a sustainable alternative totraditional fuels. This can lead to a cleaner environment and contribute to global efforts to combat climate change and ensure a sustainable future for our planet.

I. Biodiesel Helps the Environment

Investing in biodiesel has proven to be an important step towards reducing carbon dioxide emissions and raising awareness of sustainable energy sources.

By switching to biodiesel, we cansignificantly reduce our dependence on fossil fuels and mitigate the harmful environmental effects of their use. In addition, biodiesel production promotes economic growth by creating jobs and stimulating local industry. As we strive for a more sustainable future, prioritizing the use of biodiesel is good for the environment, but also promotes economic development and increases awareness of our shared responsibility to protect our planet.

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V. FINDINGS AND DISCUSSIONS

The study examines the awareness of biodiesel and its sustainable impact on the environment inBengaluru. The results of the study show that the harmful environmental effects of traditional fossil fuels must be reduced quickly, and biodiesel is a promising solution.

A. Findings

Biodiesel is a sustainable and efficient alternative fuel source that can significantly mitigate thenegative effects of traditional fossil fuels. It can reduce greenhouse gas emissions and air pollution, promote energy independence and support local economies. Biodiesel should be paidmore to reduce greenhouse gas emissions and support sustainable and environmentally friendlypractices. The availability of biodiesel in the city is crucial for consumers to switch to a more environmentally friendly fuel. Public and private sector operators must ensure that biodiesel fuelis readily available to consumers. Choosing biodiesel is a necessary choice to reduce our carbon footprint and combat the negative effects of climate change. Biodiesel produced from renewable natural resources produces less harmful pollutants and greenhouse gasses. Research into alternative fuel sources such as biodiesel is essential to mitigate the negative effects of traditional fossil fuels. The introduction of biodiesel as an alternative fuel is necessary not only to protect the environment, but also to promote a more sustainable and just society. People would like to try driving biodiesel vehicles in the future as their availability increases. The widespread availability of biodiesel vehicles would make it easier for individuals to make environmentally conscious choices. The availability of biodiesel vehicles is necessary to increase the use of biodiesel as a profitable alternative to traditional fossil fuels. Making green energy decisions isour moral duty as consumers, and the availability of green energy sources makes this possible.

Biodiesel can improve the performance of certain types of cars, in addition to being a responsibledecision that can help reduce our dependence on fossil fuels.

B. Discussions

The results emphasize the importance of raising awareness and promoting the widespread availability and use of biodiesel. Biodiesel offers a promising solution to various environmental and social challenges. Consumers can support sustainable and environmentally friendly practices by paying more for biodiesel, and government and private sector operators must ensure that biodiesel fuel is readily available to consumers. To mitigate the negative effects of traditional fossil fuels, alternative fuel sources such as biodiesel must be explored. The widespread availability of biodiesel vehicles would make it easier for individuals to make environmentallyconscious choices, and initiatives are needed to increase the availability of biodiesel cars.

Making green energy decisions is our moral responsibility as consumers, and biodiesel can improve the performance of certain types of cars in addition to being a responsible decision thatcan help reduce our dependence on fossil fuels. the study shows that biodiesel presents a promising solution to various environmental and social challenges in the city of Bengaluru.

The findings and discussions highlight the urgent need to reduce the negative effects of traditional fossil fuels on the environment, and biodiesel presents a viable alternative. Initiativesare needed to increase the availability of biodiesel-powered vehicles and ensure that biodiesel fuel is readily available to consumers. Consumers can support sustainable and environmentally friendly practices by choosing biodiesel and making environmentally friendly energy decisions.

VI. LIMITATIONS AND FUTURE SCOPE

Biodiesel is a renewable fuel made from vegetable oils or animal fats that can be used as a substitute for conventional diesel fuel. Biodiesel has many advantages over traditional diesel, such as lower emissions and higher energy content. However, there are several limitations thatneed to be addressed to promote the widespread use of biodiesel.

The study is limited only to the city of Bangalore, which may not be representative of the entire population of India. The results of the study conducted in Bangalore may not be applicableto other parts of the country. Therefore, further research needs to be done in other cities to betterunderstand people's perceptions and attitudes about biodiesel.

Biodiesel production is not yet at full speed in India, which limits its availability and availability to the general public. Biodiesel production must be increased to meet the growing demand for cleaner fuels. Government can take initiatives to encourage more investment in biodiesel production facilities to make it cost effective.

The research survey is conducted on a limited number of individuals aged 18-26, who may not represent the views of the entire population. To realize the full potential of biodiesel, the views ofthe elderly and people from different socio-economic backgrounds must be taken into account.

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Biodiesel is expensive to produce, making it less attractive to investors. High production costscan also lead to higher prices for end consumers. This can be addressed by implementing a policy of subsidizing biodiesel production and reducing overheads to make it more accessible tothe public.

The availability of biodiesel is very low, which limits its availability to the general public. Moreefforts should be made to increase the availability of biodiesel by investing in the necessary infrastructure for marketing and storage of biodiesel.

There is very little awareness about biodiesel in Bangalore which could be addressed by conducting awareness campaigns to inform people about the benefits of biodiesel. This can be done by creating public announcements, organizing seminars and other educational programs. The benefits of biodiesel are great, but the resources to reap the full benefits are few. More research is needed to determine the best practices for producing and using biodiesel to maximizeits benefits. Government policy to increase production of biodiesel and biodiesel engines is minimal. The government can take more initiatives to promote biodiesel production and use, such as tax incentives and subsidies for biodiesel production and infrastructure development. The initiative to switch to biodiesel vehicles is low, which could be addressed by implementing policies that encourage the use of biodiesel vehicles, such as lowering taxes, fuel prices and government incentives.

Limitations of biodiesel include its limited availability, high production costs, lack of awareness and low government support. However, these limitations can be overcome by adopting policies that increase production and distribution, reduce costs and increase awareness. With the right support, biodiesel can become a sustainable and cleaner fuel source that reduces dependence on fossil fuels and improves the environment.

REFERENCES

[1] Atabani, A. E., Silitonga, A. S., Badruddin, I. A., Mahlia, T. M. I., Masjuki, H., & Mekhilef, S.(2012). A comprehensive review on biodiesel as an alternative energy resource and its characteristics. Renewable and sustainable energy reviews, 16(4), 2070-2093.

[2] Hoekman, S. K., Broch, A., Robbins, C., Ceniceros, E., & Natarajan, M. (2012). Review of biodiesel composition, properties, and specifications. Renewable and sustainable energy reviews,16(1), 143-169.

[3] Demirbas, A. (2009). Progress and recent trends in biodiesel fuels. Energy conversion andmanagement, 50(1), 14-34.

[4] xue, J., Grift, T. E., & Hansen, A. C. (2011). Effect of biodiesel on engine performances andemissions. Renewable and Sustainable energy reviews, 15(2), 1098-1116.

[5] Suganya, T., Varman, M., Masjuki, H. H., & Renganathan, S. (2016). Macroalgae and microalgae as a potential source for commercial applications along with biofuels production: abiorefinery approach. Renewable and Sustainable Energy Reviews, 55, 909-941.

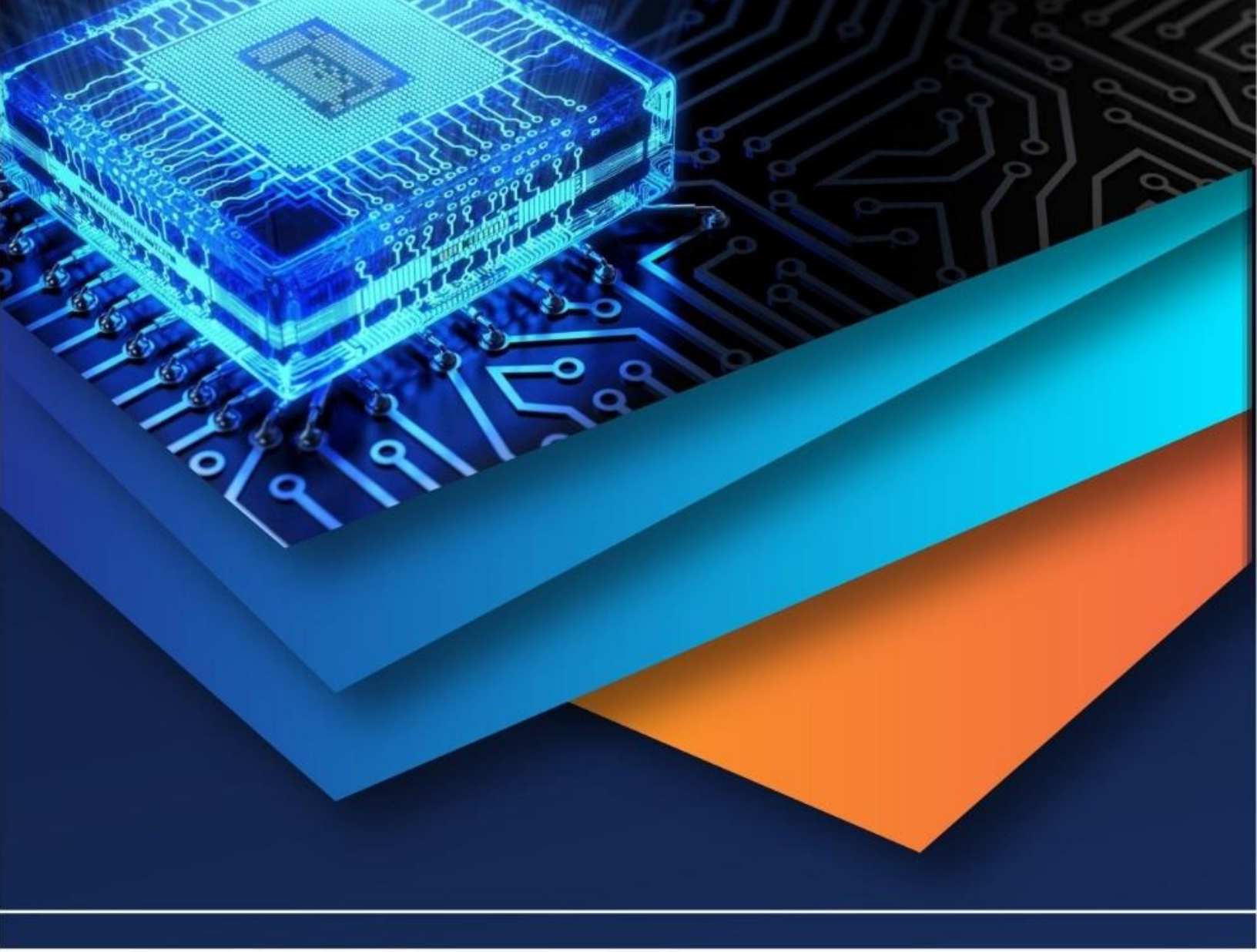
[6] Lapuerta, M., Armas, O., & Rodriguez-Fernandez, J. (2008). Effect of biodiesel fuels on dieselengine emissions. Progress in energy and combustion science, 34(2), 198-223.

[7] Demirbas, A. (2007). Importance of biodiesel as transportation fuel. Energy policy, 35(9),4661-4670.

[8] Muthu, H., SathyaSelvabala, V., Varathachary, T. K., Kirupha Selvaraj, D., Nandagopal, J., & Subramanian, S. (2010). Synthesis of biodiesel from Neem oil using sulfated zirconia via tranesterification. Brazilian Journal of Chemical Engineering, 27, 601-608.

[9] Archana, A., Vijay Pradhap Singh, M., Chozhavendhan, S., Gnanavel, G., Jeevitha, S., & Muthu Kumara Pandian, A. (2020). Coconut shell as a promising resource for future biofuel production.Biomass valorization to bioenergy, 31-43.

[10] Dhondt, F., Muthu, S. S., Dhondt, F., & Muthu, S. S. (2021). Sustainable Hemp Products. Hempand Sustainability, 95-107.



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