

Making of Briquettes using Bio-degradable Waste- A Review

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Abstract: Solid waste management poses a significant challenge on college campuses, where substantial amounts of biodegradable and non-biodegradable waste are generated daily. Effective management of this waste is vital for maintaining a clean environment and fostering sustainability. At D.Y. Patil College of Engineering, Akurdi, Pune, green waste is particularly abundant, prompting the need for innovative solutions. One such approach is converting biodegradable waste, such as food scraps and yard clippings, into briquettes that serve as an efficient fuel source. This process utilizes natural binders like cow dung and molasses, which are cost-effective and environmentally friendly, improving the cohesion of green waste materials to form dense, high-quality briquettes.

The method involves collecting and drying green waste, shredding it, blending it with binders, compressing it into briquettes, and drying the final product to enhance its durability and stability. This study examines the practicality and advantages of this process, focusing on improving waste management, advancing sustainability, and providing an affordable energy alternative. It also presents educational and research opportunities for students and contributes to energy security by offering a renewable energy source. Testing indicated that briquettes made with molasses exhibit higher calorific values, while those made with cow dung have a higher ash content. Biomass briquettes serve as a cleaner alternative to wood fuel, supporting better health outcomes, climate change mitigation, and economic benefits. This initiative aligns with sustainable development goals by providing renewable energy, managing waste efficiently, and promoting economic growth through job creation and enhanced rural livelihoods.

I. INTRODUCTION

Solid waste management is a major challenge for many institutions, including college campuses, where significant amounts of both biodegradable and non-biodegradable waste are generated daily. Efficient waste management is crucial for maintaining a clean, healthy environment, promoting sustainability, and reducing the

environmental impact of waste disposal. Biodegradable waste consists of organic materials that decompose naturally over time, such as food scraps, yard waste, and paper products, while non-biodegradable waste includes materials like plastics, metals, and glass, which do not break down easily. Proper management of both types of waste is vital to minimizing environmental harm. The College of Engineering Akurdi, Pune, generates a large amount of green waste. Non-biodegradable waste, with its low heating value per unit volume, creates transportation and storage challenges on the D.Y. Patil College of Engineering Akurdi campus. One innovative, eco-friendly solution to this issue is the production of briquettes from biodegradable green waste. This process involves converting organic waste, such as food scraps, yard clippings, and other biodegradable materials, into a valuable fuel source. Not only does this approach address waste management challenges, but it also provides a sustainable alternative to traditional fuels. By using natural binders like cow dung and molasses, the production of briquettes becomes both cost-effective and environmentally friendly. These binders enhance the briquetting process by ensuring the green waste materials are compacted into dense, efficient fuel briquettes. The process involves collecting green waste, processing it to remove contaminants, and mixing it with the natural binders before compressing the mixture into briquettes. This paper examines the feasibility and advantages of producing briquettes from green waste on a college campus, focusing on the use of natural binders to optimize the briquetting process. The study aims to demonstrate how this method can contribute to sustainable waste management, energy production, and a reduction in the environmental impact of waste disposal and fossil fuel usage. Additionally, it encourages renewable energy practices within educational institutions. By adopting this method, campuses can manage organic waste more effectively while generating a renewable energy source in the form of fuel briquettes, thereby

advancing sustainability goals and reducing carbon footprints. Converting green waste into fuel briquettes provides an effective, sustainable solution for cooking and heating needs. These briquettes, produced through densification, are dense, compact discs of organic waste that burn cleaner than traditional fuels like firewood and charcoal, reducing environmental impact and improving air quality.

II. NEED OF STUDY

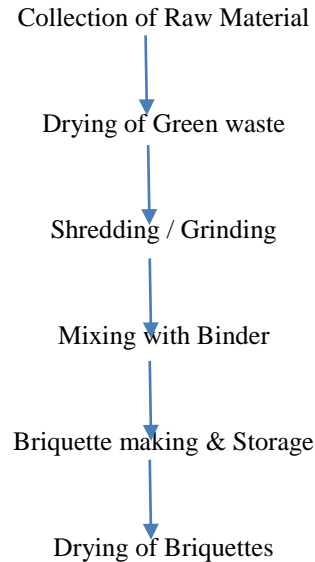
1. Using organic solid waste to improve the environment.
2. Reaching cleanliness objectives through the reduction of solid waste.
3. Conserving non-renewable resources, such as oil and kerosene.
4. Promoting environmental balance by adopting renewable energy.
5. Sustainable energy solutions.

III. OBJECTIVES

1. Waste Management Improvement
2. Environmental Sustainability
3. Cost-Effective Energy Solution:
4. Educational and Research Opportunities

IV. METHODOLOGY

The process of making briquettes from green waste involves several essential steps. First, raw materials, mainly organic green waste such as plant residues, wood chips, or sawdust, are collected. These materials are then dried to reduce their moisture content, making them suitable for further processing. After drying, the waste is shredded or ground into smaller, uniform particles to facilitate mixing. The particles are combined with natural binders like cow dung and molasses, which help bind the materials together. The resulting mixture is compressed into briquettes using specialized equipment in a process called briquetting. The newly formed briquettes are dried once more to remove any remaining moisture, ensuring their strength and stability. Finally, the dried briquettes are stored in appropriate facilities until they are ready for use or distribution.



V. TESTS NEED TO BE PERFORMED

1. Moisture Content
2. Fixed Carbon
3. Ash Content
4. Calorific Value

VI. SCOPE OF STUDY

The highest calorific value can be achieved when green waste is combined with a molasses binder. The calorific value of the briquettes produced can be compared to that of conventional fuels, such as firewood, commonly used in boilers. Using briquettes must be a viable alternative to these fuels in terms of calorific value.

Briquettes made with cow dung binders tend to have a higher ash content compared to other briquettes. As a result, they are not recommended for use in boilers, as they may cause slagging. Study can be conducted with green waste mixed with the appropriate proportions of binders, it has the potential to serve as an effective replacement for traditional fuels like firewood and coal, both in boilers and for domestic use. Future studies should also analyze other key characteristics, such as sulfur content and specific density.

Producing briquettes from biodegradable waste greatly improves environmental sustainability by reducing landfill waste and greenhouse gas emissions. This process conserves natural resources by providing a renewable, cleaner alternative to fossil fuels. It also fosters a circular economy by

transforming waste into valuable energy sources, contributing to long-term environmental protection and resource conservation.

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