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Multipurpose Biodegradable Gloves and Masks

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Abstract

Introduction: Recent years have seen a surge in usage of masks and gloves. Many brands are coming up with new models of masks with varying price ranges. On the one hand, there is an increase in mask usage by the population; on the other hand, there is also an increasing demand for disposing of it.

Objectives: To produce Multipurpose Biodegradable Gloves and masks by using biodegradable material which is eco-friendly.

Methods: Bagasse is better for the environment because they are biodegradable and compostable. Then the bagasse is dried well and crushed into smaller pieces. The smaller particles of bagasse is heated at 80°C and made into a fine powder. Due to having antimicrobial and antiviral properties, it is generally utilized in FDA-endorsed wound and consumption medicines. Along with the bagasse powder, we added glycerol, acetic acid, and, water in a sufficient amount. After adding the above-mentioned components into the bagasse powder we mixed it with the magnetic stirrer at 1100 rpm for a few minutes until it was mixed well. Then the result of that is sticky glue liquid. The autoclave sheet is used for spreading the sticky glue liquid which is used to kill the microorganisms. Then the sheet is kept in the hot air oven and heated at the temperature of 80°C. After heating the sheet in the oven it is made into the shape of gloves using molds as the biodegradable shape of gloves.
Results: The result shows the sample is made up of bagasse and corn starch have preferable biodegradability over the current plastic materials. The expansion of corn starch improves the period of usability of the material and improves the mechanical properties.

Conclusions: The requirement for bioplastics is currently like never before as the pace of plastic creation and air contamination has expanded at a quick rate. Moreover, plastics likewise cause numerous well-being dangers in light of their harmful nature. In this way, bioplastics can be most appropriate as a choice to improve solid life and continue a contamination-free planet. The advancement of bioplastics assists with tackling a significant number of these maintainability issues, offering the capability of inexhaustibility, biodegradation, and away from hurtful added substances and sound earth.

Keywords: Biodegradable, Bagasse, Bioplastics, Masks, Gloves.

1. Introduction

In recent years, the usage of masks and gloves has surged, with many brands introducing new models of masks at varying price ranges. There is an increase in the use of masks by the population, but also an increasing demand for their disposal. To produce a Basic Medical Kit, which includes gloves and masks, we should use biodegradable material that improves environmental conditions and sanitation. In 2012, the production of clinical lube latex gloves expanded up to 140 billion pieces. The essential guideline of good (BMWM) practice relies on the concept of 3Rs: reduce, reuse, and recycle. In 2012, the World Health Organization (WHO) surveyed the BMWM of 24 nations in the western Pacific zone, including India. In July 1998, in India, the BMW issue was further exacerbated by the presence of scavengers who sorted out unreported

healthcare waste without any gloves and masks. In 2016, a survey was carried out on biomedical waste, such as rubber latex gloves and masks. To obtain bioplastics, the starch from natural materials and plasticizer materials for processing are used. The characteristics of bioplastic material must be studied before a composed mixture of materials can be processed to manufacture the medical kit. Face masks are important components of surgical attire. They protect the person from inhaling any potential hardeners and infective particles from entering the oral or nasal space. The face mask also prevents bacteria and viruses from dispersing in the vicinity of the operative site from the surgeon's oropharynx or nasal pharynx, which are some of the most microbe-infected parts of the human body. This investigation was carried out to check the efficiency of face covers and hand gloves.

2. Problem Statement

Wearing face masks has become the new normal for many people, but it has also come at a great environmental cost due to the rise in single-use masks and disposable gloves. These masks are usually made of polypropylene, a plastic derived from fossil fuels that takes hundreds of years to break down. Recycling single-use masks and gloves is difficult, especially since virgin plastic is much cheaper and it costs more to collect, separate, and recycle the PPE than the resulting recycled material a biohazard and cannot be recycled or biodegraded, which has led to their accumulation in our oceans, adding to the already-depleting plastic pollution that threatens marine life and the health of our oceans. Environmentalists have raised concerns about the use of disposable masks and gloves due to the negative impacts they have on our environment.

3. Objective

To produce Multipurpose Biodegradable Gloves and masks by using biodegradable material which is eco-friendly.

- To obtain Bioplastics we used the starch from bagasse and plasticizer materials for processing.
- The characteristics study of Bioplastics material has been done.
- Bioplastics are completely biodegradable and compostable.
- Starch-based bioplastics can be used to reduce the carbon footprint of traditional resins because they can replace petroleum-based polymers with natural ones.
- It does not have any specific degradation process.
- A composed mixture of materials has to be processed for the manufacturing of the Biodegradable Gloves and mask.
- This is used to create better sanitation around our environment.

4. Proposed Method

-Make bagasse into smaller pieces.

It is utilized as a biofuel for the creation of warmth, energy, and power, and in the production of mash and building materials. Bagasse is better for the environment because they are biodegradable and compostable. Then the bagasse is dried well and crushed into smaller pieces.

-The smaller pieces are kept in the hot air oven.

Hot air broilers are electrical gadgets that utilize dry warmth to disinfect. They were initially evolved by Pasteur. By and large, they utilize an indoor regulator to control the temperature. Their twofold walled protection keeps the warmth in and saves energy, the internal layer being a helpless transmitter and the external layer being metallic. The smaller particles of bagasse are heated at 80°C and made into fine powder.

-Along with the bagasse powder we add glycerol, acetic acid, and water.

Glycerol is a straightforward polyol compound. It is a dull, scentless, thick fluid that is sweet-tasting and non-harmful. The glycerol spine is found in those lipids known as glycerides. Due to having antimicrobial and antiviral properties, it is broadly utilized in FDA-endorsed wound and consume medicines. It is utilized as a cream to treat or forestall dry, harsh, layered, bothersome skin and minor skin aggravations. It can likewise be utilized as a plasticizer material. Acidic corrosive is otherwise called the second most straightforward carboxylic corrosive. Acidic corrosive is most famously known in light of its utilization in vinegar. A dominant part of the acidic corrosive created is utilized to deliver vinyl acetic acid derivation monomer (VAM), which is the structure square to make paints, cement, bundling, and so on Alongside

the bagasse powder, we added glycerol, acidic corrosive, and water in an adequate sum.

-After adding the compounds to the powder, mix it with a magnetic stirrer.

An attractive stirrer or attractive blender is a research facility gadget that utilizes a turning attractive field to create a scene bar submerged in a fluid to turn rapidly, accordingly mixing it. The turning field might be made either by a pivoting magnet or a bunch of fixed electromagnets, put underneath the vessel with the fluid. After adding the above-mentioned components to the bagasse powder we mixed it with a magnetic stirrer at 1100 rpm for a few minutes until it was mixed well. Then the result of that is sticky glue liquid.

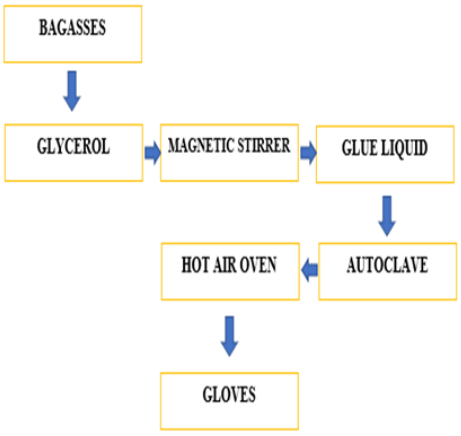
-Spread that liquid in the autoclave sheet and heated.

The autoclave sheet is used for spreading the sticky glue liquid which is used to
kill the microorganisms. Then the sheet is kept in the hot air oven and heated at the temperature of 80°C.

-Made into the shape of gloves.

After heating the sheet in the oven it is made into the shape of gloves using molds as the biodegradable shape of gloves.

Block Diagram



5. Results

The result shows the sample is made up of bagasse and corn starch have preferable biodegradability over the current plastic materials. The expansion of corn starch improves the period of usability of the material and improves the mechanical properties. Through the investigations, the expansion of the antimicrobial specialists will assist with securing against microscopic organisms and infections. This improves the lifespan of the gloves. As it was made up of natural materials and done in a very short time it is easily available to poor people. This improves sanitation among the sanitary workers.

6. Discussion

With tons of disposable gloves being used each year, it has become a major environmental concern due to the harmful materials. These bright-colored plastic wastes get washed down into the ocean and are often mistaken as food by marine mammals, turtles, and seabirds. As a solution to the present piling of plastic wastes, many have suggested using additives to break down the plastic into carbon dioxide, water vapor, and natural elements with the help of microorganisms like fungi and bacteria. When biodegradable plastic products get piled up in landfills, they break down without oxygen to release methane gas. Hence it's advisable to opt for eco-friendly disposable gloves that are harmless in the long run. Also in the medical field to bring in new material that is both biodegradable and performs well in terms of filtration, durability, fluid resistance, minimal leakage of molecules, etc. The requirement for bioplastics is currently like never before as the pace of plastic creation and air contamination has expanded at a quick rate. Moreover, plastics likewise cause numerous well-being dangers in light of their harmful nature. In this way, bioplastics can be most appropriate as a choice to improve solid life and continue a contamination-free planet. The advancement of bioplastics assists with tackling a significant number of these maintainability issues, offering the capability of inexhaustibility, biodegradation, and away from hurtful added substances and sound earth.

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