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ECO-FRIENDLY BIOPLASTIC PRODUCTION FROM STARCH OF PLANT RESOURCES

S. D. Shaikh* and Shweta S. Jadhav

*Department of Botany, Abasaheb Marathe Arts and New Commerce, Science College, Rajapur.

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For Correspondence:

S. D. Shaikh

Department of Botany, Abasaheb Marathe Arts and New Commerce, Science College, Rajapur.

E-mail:

lakish786@gmail.com

ABSTRACT

Bioplastics substances have been increasingly highlighted as means for saving fossil fuels, reducing CO2 emission and plastic wastes. Biodegradability of bioplastics has been widely publicized in society and the demand for packaging is rapidly increasing among retailers and the food industry at large scale. These are becoming prominent owing mainly to scarcity of oil, increase in the cost of petroleum-based commodities, and growing environmental concerns with the dumping of non-biodegradable plastics in landfills. In the present investigation attempts were made to produce bioplastics by using plant resources such as Sago, Corn, Wheat and potato starch.

INTRODUCTION

Plastics have become a big environmental trouble. The plastics that do deposit in landfills degrade gradually, which can cause the original products to remain in our landfills for hundreds or even thousands of years. Biodegradable plastics are becoming a new movement because they are believed to be friendlier to our ecosystem. Biodegradable plastics are plastics that will decompose in both aerobic and anaerobic environments. Unlike conventional plastics, "a genuine biodegradable plastic will be converted to carbon dioxide, water and compost, without any persistence or toxic residue" [1]. Biodegradable plastics have the capability to significantly decrease the quantity of plastics within our landfills, and also remove toxins within our air from the burning of amount of plastics within our landfills[1]. Biodegradable plastics are made from renewable raw materials, and presently found in various forms with different degree of biodegradability. One of the most regular used forms of biodegradable plastic is term as hydrobiodegrable plastic. Unlike conventional plastics, which are comprised primarily of starches that are found in plants or food although some contain a small percentage of synthetic polymers. When hydrobiodegradable compounds are degraded, the original product reduces to water, carbon dioxide, methane, and biomass [2]. That the need of destroying it is become very essential. But practically it was not possible to make the all world plastic free, because the people get in habit of using it. It is now relatively rare for anyone in India to go for marketing without a plastic bag. Even for a very small purpose they buy plastic bags and do not use old one or a cloth bags. But our scientist get discovered the way to recycle it, although there is a need remains to reduce its uses.

Therefore it is very essential to develop easy and comfortable methods to produce a biodegradable plastic that get decompose and maintain the habit and budget of peoples.

MATERIAL AND METHODS

Bio-plastic was made from many different sources and materials like Corn starch, Sago starch, Potato starch, Wheat starch. In the present finding the materials used are easily available in local market, household, hygienic, the chemicals used are non-poisonous for children's and all.

METHODOLOGY

Put 1 tablespoon of starch into the cooking pot. Then added 4 tablespoons of water, 1 teaspoons of vinegar, 1 teaspoon of glycerine, a few drops of food colouring (if desired), Mixed and turned the heat on medium. This medium stirred continuously. The mixture turned from a liquid, white mixture to clear, gel like consistency. The careful observations were

made and when it begins to boil and bubble, it is done. Turned the heat off and removed the pot from the heat. Pour the gel onto the aluminum foil. Spread as thin or thick as you like. Depending on the humidity, it might take up 24hrs to cool completely.

Figures

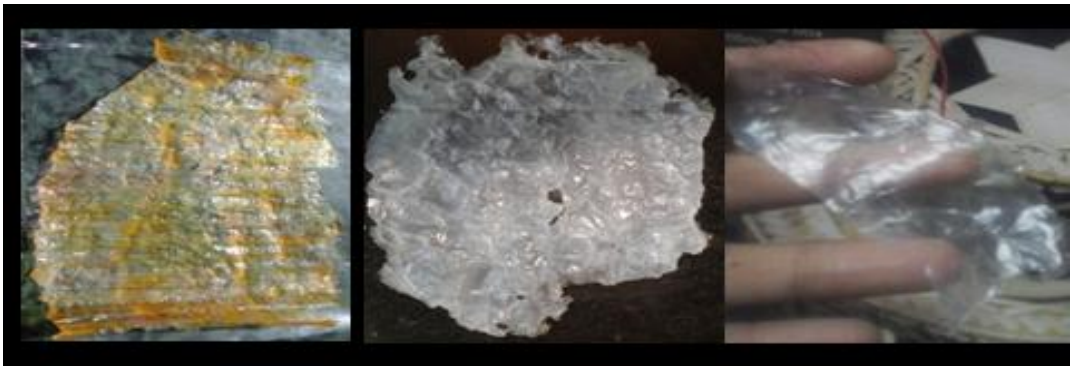

Fig. 1. Production of bio plastic from different plant resources

RESULTS

The bio-plastic we made is thick or thin in texture depending on skills and selectivity of material. It is flexible as compare to normal plastic. The bioplastic obtained from the different plant resources shows variable characteristics. For getting better quality the further advance studies should be made. The attempts are ongoing for the same.

DISCUSSION

Bioplastics are growing rapidly because of the clear advantages they have in many applications. As oil supply tightens these advantages will grow. Their carbon footprint can be much lower than oil-based equivalents. Bioplastics can supply excellent biodegradability, helping the world contract with the increasing problems of litter, particularly in the world's rivers and seas. Durable plant-based bioplastics can also be recycled as well as their conventional equivalents, assisting the enlargement of extra sustainable world economy [3-5]. Researchers started to look if plastics could be designed to become susceptible to microbial attack, making them degradable in a microbial active environment. Biodegradable plastics opened the way for new considerations of waste management strategies since these materials are designed to degrade under environmental conditions or in municipal and industrial waste treatment facilities. However, the production value of Polyhydroxyalkanoate (PHA) is quite high compared with that of synthetic non-biodegradable, and so large effort has been recently devoted to making this process economically more feasible, for instance, by changing the substrate from glucose to renewable resources.

What makes bioplastic especially important is that petroleum oil price is increasing tremendously and its stock will end in the near future. It is important for the global community to have an alternative for the product derived from petroleum oil such as plastics. PHAs at least will be a solution for the most of the industries and society, which largely depend on materials made from plastic. No new inventions can escape from the limitations and drawbacks and bioplastics too have some drawbacks. The most important drawback for PHA production is its production cost, but the good news is that the price of PHA production is decreasing, whereas, petroleum oil price is increasing constantly, Kumar *et al.*, [6]. As a result, the gap between the petroleum oil and PHA are becoming very narrow. The first potential application of PHA polymers was recognized in the 1960s. PHA patents cover a wide range of PHAs products such as coating and packaging, bottles, cosmetic containers, golf tees, and pens, Webb [7]. PHAs have also been processed into fibres, for a non woven fabrics material, Son *et al.*, [8]. PHAs can be used for all sorts of biodegradable packaging materials, including composting bags, food packaging, sanitary articles like diapers and fishing nets, Javed and Gruys [9], biodegradable rubbers, Walle *et al.*, [10]. Polyhydroxyalkanoate are also used to develop scaffold for tissue engineering, Simmon *et al.*, [11], and also posses numerous applications in pharmacy and medical science.

Bioplastics can provide excellent biodegradability, helping the world deal with the increasing problems of litter particularly in the world's rivers and seas. Durable plant-based bioplastics can also be recycled as well as their conventional equivalents, assisting the growth of a more sustainable world economy [12-14]. Further research on recombinant microbial strains, mixed cultures, efficient fermentations, recovery or purification and the use of inexpensive substrates can substantially reduce the production cost. Therefore, the future of bioplastics depends on the efforts towards fulfilling price as well as performance requirement.

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