PRODUCTION OF BIOPLASTIC

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Abstract

Bioplastics are plastics made from renewable resources such as corn starch, potatoes, and microbial species. Bioplastics can break down in either aerobic or anaerobic environment. Bioplastics can be composed of cellulose, starches, biopolymers and a variety of other material. These environment friendly polymers decrease rapidly and replace the usage of the petroleum-based synthetic polymers due to their low production costs, safety, and biodegradability. The ability of the bioplastics to be biodegradable makes them a desirable substitute for petrochemical-based plastic. By increasing the production of bioplastics, consumption of fossil fuel and carbon dioxide emission can be reduced. To maintain the quality of the environment agricultural residues management is considered to be a vital strategy in order to carry out resource conservation[1]. Production of petro-based polymers tends to require more fossil fuels and to produce more greenhouse gases than the production of bioplastics. Some, but not all bioplastics are designed to biodegradable.

Keywords: - biodegradable plastics, bioplastics, biopolymers, petro-based polymers.

Introduction: -

Plastics used today are originally made of petroleum based which is harmful to the environment. It takes about 100 years to completely decompose a single plastic waste. Biodegradable polymers become wider the range of waste management treatment option over conventional plastics.[1], [3] Therefore, biodegradable polymers can make significant contributions to material recovery, reduction of landfill and utilization of renewable resources. Because of the difficulty in recovering the conventional polyethylene mulching film after its use, biodegradable films have been developed and commercialized.[1], [4]. These films usually made of bio-based materials which can be buried in the soil after their use in order to be decayed by microorganisms. Biodegradable plastics, based on cellulose acetate (CA), were studied and the plastic which produced was decomposed in soil or water within a few years. The use of low cost or negative value cellulosic raw materials is attractive because the raw materials have a high impact on the cost of bio-based plastic production.[5] For the preparation of Cellulose acetate this work aims to use low cost cellulosic raw materials and some reports have been proposed on the preparation of cellulose acetate

by the process of acetylation from flax fiber. Consequently, flax fibers and cotton linters were used in this work for the production of CA.

Procedure: -

dusts, colors, and fats were expelled from flax fibers and cotton linters by washing with water and bleaching with (5% NaOCl and 5% NaOH), altogether washing and, at that point, was followed by drying[1]. An example of every raw material was utilized. Acidic anhydride,glacial acetic acid and sulfuric acid were blended and the blend was cooled to 7 °C[2]. Flax fibers or cotton linters were added gradually to the previous mixture with agitation to bring the acetylation process;this step created the essential CA. Hydration of the essential CA was accomplished by weakening with of equivalent pieces of concentrated acidic corrosive and sulfuric acid and, at that point, the essential CA was permitted to age for 15 h. The subsequent thick fluid was centrifuged so as to isolate the final product. Polyethylene glycol 600 was added as 25% by volume of the thick CA with agitation; this formed the final product which was dried in an oven at 60 °C until a steady weight so as to prepare the product for use[1].

Result: -

The cellulose acetate which produced from the flax fibers and cotton linters was viscous fluid with nearly the same color. Therefore, the acetylation process, used in this work, produced just about the same CA from the two different residues but they differed in the percentage of production yield.

Conclusion: -

The results of this study confirmed that cheaply available agro-residues that reducing environmental pollution problems and reducing the cost of biodegradable plastics, caused by conventional plastics and disposal problem of the agricultural wastes are solving. The natural cellulose-based CA from flax fibers and cotton linters was prepared successfully by using acetylation process and characterized by using the help of environmental properties tests and various instrumental techniques. It was found that the production yield of CA from flax fibers was higher than that from cotton linters. This CA has the potential to replace or minimize the use of non-biodegradable and petroleum-based materials

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