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Making Biodegradable Material Like Plastic Using Starch

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Abstract: *Plastics are hazardous to environment as they are as they are not decomposable because they are derivatives of strongly bonded long chain petrochemical based materials. However bio plastics can be seen as the solution to the problem. Bio plastics are made from biomass derived from plants such as cellulose, sugarcane, or rice. Starch is a natural biopolymer having mainly two types of polymer glucose. In this research work bio plastic is made using potato starch as its abundant and easily available. However, poor physico-mechanical properties like low tensile tear strength, high stiffness, elongation at break and poor moisture stability are observed in most of the starch-based materials. Development of starch-based bio plastic properties is being endeavoured by starch alteration. The physical and mechanical properties of the biodegradable plastic have been improved through some well-designed processes. Raw materials and chemicals used for production of potato starch based bio plastic are Potato, distilled water, Acetic Acid, glycerine. Different composition of the above ingredients were used to make bio degradable bio plastic. The growing environmental impact of conventional petroleum-based plastics has driven the need for sustainable, biodegradable alternatives. Starch, a naturally abundant and renewable polymer, has emerged as a promising base material for developing environmentally friendly plastics. This study focuses on the formulation and synthesis of biodegradable plastic-like materials using starch derived from sources such as corn, potato, and cassava. By incorporating plasticizers like glycerol , the brittleness of native starch is reduced, resulting in improved flexibility and usability. The addition of crosslinking agents and natural fillers further enhances the material's mechanical strength, thermal stability, and moisture resistance. The research explores the production process, Including gelatinization, blending, and casting, to create biodegradable films and composites. The biodegradability of the material is evaluated through soil burial and enzymatic degradation tests, demonstrating its ability to decompose into environmentally harmless byproducts. Potential applications of starch- based bioplastics include single-use packaging, agricultural mulch films, disposable utensils, and medical products. This work aims to contribute to the global effort in mitigating plastic waste pollution, promoting renewable resource utilization, and advancing the development of sustainable materials for a circular economy. By leveraging the inherent properties of starch, the study presents a viable pathway for reducing the ecological footprint of plastics while addressing the growing demand for sustainable alternatives.*

Keywords: Bio plastic, starch, properties, biodegradable

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