

## THE USE OF STARCH TO OBTAIN A BIODEGRADABLE FILM

S.A. Abdurazakova, S.I. Ungarova, D.Q. Shomurodov, E.A.Egamberdiev

Tashkent State Technical University named after Islam Karimov

[abdurazakovasevinch2001@gmail.com](mailto:abdurazakovasevinch2001@gmail.com)

### ANNOTATION

*This article raises the issue of the production of biopolymers for industrial polymer products as a replacement for plastic containers and packaging materials based on petroleum products. The most common polymers in the work are considered biodegradable packaging products from plant materials used to produce products such as starch, cellulose, polylactide. The work used the narrow method of Labora to obtain biopolymers and conduct test experiments. The use of plant polymers for biodegradable packaging will help solve the problem of eliminating plastic waste, and will undoubtedly improve the environmental situation both in our country and around the world.*

**Keywords.** *Bio packaging. Ecology. Biodegradable materials, plant polymers. Starch.*

**Introduction.** The waste of synthetic polymer products, which have been increasing in recent times, is a clear proof of demand and interest in biopolymers. "biopolymer" is a kind of guarantee that the product is safe for life activities for nature and people. The main reason for the development of biopolymers is also the problem of eliminating their synthetic waste, which is growing every year. Biopolymers (full name – biodegradable polymers) differ from the rest of the plastics in that they decompose in the environment under the influence of physical factors and microorganisms-bacteria or fungi. If the polymer and its entire mass decompose in the soil or water for six months, then the polymer is a biopolymer, which allows you to solve the problem of waste. In most cases, the breakdown products of biopolymers

are carbon dioxide and water. The high density of the population, the use of packaging materials in all areas of human activity and in other areas also creates the problem of the elimination of plastic waste, which is sharply increasing. Therefore, an important step in solving this global problem will be the gradual transition from plant polymers to the production and use of biodegradable packaging products. Such materials are completely decomposed in nature in a few months and can not only harm the environment, but, on the contrary, enrich the soil. Plant polymers can be obtained as the main material for the production of their products and gradually replaced with conventional oil and gas-based plastics. The development of biopolymers is carried out in two main directions: - production of biodegradable polyesters based on hydroxycarboxylic acids; - to give industrial polymers biodecomposition and to produce plastic masses based on multiplying natural components. All these technologies are actively developing. Starch is a polysaccharide that accumulates in roots, seeds, stems and leaves throughout the life of plants. On an industrial scale, it is obtained from corn, wheat, rice. The choice of starch as the basis for the creation of composite polymer materials depends on a number of reasons: - availability and almost inexhaustible raw material base; - the presence of useful properties that are not present in synthetic polymers; - the possibility of synthesizing starch derivatives. Starch is the main reserve polysaccharide of plants. It accumulates in the cells of seeds, fruits, tubers in the form of grains, as well as in leaves and stems. Starch grains contain 98-99.5% polysaccharides and 0.5–2% non-carbohydrate components (for example, lipids, proteins, ash elements). Starch is a mixture of linear (amylose) and branched (amylopectin) polysaccharides. The ratio of these components in starch depends on the type of plant and the stage of its development. On average, starch contains 15-25% amylose and 75-86% amylopectin. Plasticizers are introduced into the composition to obtain a film that is destroyed by bacteria from a mixture of amylose and amylopectin and is soluble in water: glycerin or polyoxyethylene glycol. At the same time, with an increase in the starch content, the fragility of the plyoka increases. In order to reduce the cost of biodegradable materials in Uzbekistan conditions (UPA

synthesis, film for agricultural technology, garbage bags), it is recommended to use untreated starch mixed with polyvinyl alcohol, talcum powder and other substances. Polylactide is a convenient thermoplastic, which has a suitable shelf life for use on packaging. When properly disposed of, it is hydrolyzed to natural and safe products. The production of this polymer to solve the problem of the successful elimination of a large number of plastic packaging. Today, polylactide is one of the cheapest biodegradable polymers [3, 5]. For the production of samples of packaging film as raw materials, two types of bizkrahmal are obtained: potatoes and corn. In the first case, the following ingredients were obtained: 50 g of potato starch, 5 ml of glycerin, 5 ml of table vinegar and 50 ml of water. Corn is also taken in the same proportions for starch. Water was poured into the container, glycerin and circassial acid (20%) were added, Whether mixed. Then starch was added and heated until thickened, stirring constantly. Then, the dark mass was distributed over a flat surface (aluminum foil) and laid out and dried. According to this recipe, the potato film was poorly separated and became mechanically unstable, while the corn became brittle by cracking and was not sampled.



In the second case, other proportions were taken: 10 g of potato or cornstarch, 5 ml of glycerin, 5 ml of circassial acid (20%) and 60 ml of water. All ingredients were mixed and heated until thickened, after which the mixture was evenly distributed over the foil and left to dry. In this case, films that do not tear when stretched turned out to be of good quality. A study conducted showed that from potato and cornstarch, under normal conditions with the addition of glycerin and organic acid, films that are sufficiently resistant to mechanical action can be obtained. These films easily

decompose into substances completely harmless to nature due to bioparchalization in the soil or water in a few months. These tiles can be used for food bags, disposable picnic containers, garbage bags, agricultural needs.

**Conclusion.** A study conducted showed that under normal conditions, films with sufficient resistance to mechanical action can be obtained with the addition of potato and cornstarch, glycerin and organic acid. These films easily decompose into substances completely harmless to nature due to bioparchalization in the soil or water in a few months. These tiles can be used for food transportation bags, disposable picnic containers, garbage bags, agricultural needs.

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