BIOPOLYMERS FROM FOOD WASTES

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Economic and social progress over the last century has been accompanied by environmental degradation that is endangering the very systems on which our future development, our very survival depends. Worldwide consumption and production is a driving force of the global economy which rest on the use of the natural environment and resources, and waste generation. Around the world, waste generation rates are rising. In 2020, the world was estimated to generate 2.24 billion tonnes of solid waste. With rapid population growth and urbanization, annual waste generation is expected to increase by 73% from 2020 levels to 3.88 billion tonnes in 2050. Food and plastic waste constitutes a remarkable portion of municipal solid waste, with the bulk of it ending up in landfill, incinerated or leaking into the environment.

The waste resulting from synthetic plastic materials (especially those from packaging) has greatly expanded in the surrounding environment and it has become a serious global problem. Thus, the scientists began to research biopolymers made of natural sources of plant, animal, insects, microbes or their waste. So, in order to produce bioplastic materials, it can be used the food waste (husk, leaves, sawdust, egg shells, exoskeletons of crustaceans and so on), which, also, are recycled for energy recovery or to produce fuels, cement, fertilizers, biosensors, nanomaterials, fillers, fibers etc. [1]. The most important characteristics of the food waste are regenerability, compostability, biodegradability and low cost. The natural biopolymers can be produced from polysaccharides, such as starch (rice, potato, wheat and corn), cellulose (straw and wood), chitin (crustaceans and insects), lignin (various plants) and, also, from proteins such as collagen (pig and cattle skin and bones). The biopolymers produced by various microorganisms and bacterial fermentation of cellulosic, agro and organic waste are the polyhydroxyalkanoates (PHAs). The properties of polyhydroxyalkanoate copolymers can be adjusted so that they can replace petroleum-based polymers such as polyethylene (PE), polypropylene (PP) and polyethylene terephthalate (PET). Thus, the natural and microbial biopolymers often are used for food packaging applications.

Keywords: biodegradability, biopolymers, environmental protection, plastic waste

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