

Biodegradable plastics from potato starch



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Throughout the 20th century, plastics have been an essential part of the market industry. Most plastics are a combination of other organic and inorganic compounds; 20% of the content of a plastic is composed of additives. Biodegradable plastics are usually derived from proteins such as those that are present in a potato plant. Polymers are large molecules consisting of many repeating units, called monomers. Polymers can be made out of starch which is composed of long chains of glucose molecules.

This study focuses mainly on making biodegradable plastics, which is certainly safer than non-biodegradable plastics, from potato starch.

Biodegradable plastics made from raw materials are completely reusable and can be composted easily. Potato starch contains minimal protein and fat. Potato starch is a Polymer made of long chains of glucose units joined together. Potato starch contains two polymers: Amylopectin, highly-branched molecules, making up the majority of the starch found in plants, and Amylose which contains long, chain-like molecules.

Potato starch is a versatile material because it has the ability to bind and thicken; it can also be used as an ingredient in making papers, construction materials, adhesives, and other non-food products. There are many product developments that are based on the starch of the potato, products like biodegradable eco-plastics, foam packaging chips, carrier bags, and trays that can be used for food. In terms of biochemistry, starch is a polysaccharide sugar. Its sugar has a component called glucose. The two components, Amylose and Amylopectin, determines the characteristic of the starch of the potato.

Normally, the ratio of amylose to Amylopectin is around 1: 4 to 1: 5. The most valued characteristics of starch such as good adhesive properties are due to the Amylopectin, which is therefore the more coveted component. The separation of two components is very expensive for the processing industry. It can also result in a very large amount of wastewater. For this reason, potatoes that have high contents of Amylose and Amylopectin are the primary sources of making raw materials. Plastics made from potato starch are not much known in the global industry of plastic-making.

The starch of the potato is a biopolymer with the same properties such as those that are present in conventional plastics. Most plastics known are made from organic polymers that are based on chains of carbon atoms. There are over billion tons of plastics that have been wasted and may degrade for hundreds or thousands of years because of its durability. For this reason, all plastics that have been wasted can occupy a huge area of land that becomes a carbon sink and can cause climate change. Statement of the Problem Research Question:

Can biodegradable plastics be produced using the starch of a potato? Sub-Questions: 1. What are the other components of potato that can help in making biodegradable plastics? 2. Are there components of potatoes with the same properties and components as synthetic plastics? 3. How can the plastics from potato starch help restore the environment that people had in past hundred years? Hypothesis Potato starch can be used as an alternative biodegradable plastic, all sorts of starch can be utilized to produce a biodegradable plastic which is 100% biodegradable and compostable.

Less energy is needed in order to completely compost bio-plastics which are mostly made from starch, whereas more energy is needed to completely compost plastics made from fossil fuels. With that, we can say that using bio-plastics is more conventional and affordable instead of plastics made from fossil fuels. Potato starch is the only component of potatoes that can be used to make biodegradable plastics. Biodegradable plastics are expensive to produce because only the starch of a certain organic compound can be used to produce one, other components of the compound will be thrown away.

Synthetic plastics are made from petrochemicals, these kind of plastics when produced will be harmful for the environment; thus synthetic plastics will be worse than any kind of plastic. Components of petrochemicals make up the entirety of synthetic plastics, petrochemicals are extracted from fossils.

Thus, using potato starch as a main ingredient in making plastics will help the environment preserve its natural components. Significance of the Study We are all aware how important plastics are. We have been using plastics for a long time, but now it is prohibited in some places here in our country, Philippines.

Many people, specifically shoppers, are not in favor of prohibiting plastics because they knew it would be hard for them to carry their things, especially when they go shopping and have their groceries. Though plastics are indeed big help for us because it helps us handle things easier, it doesn't undermine the fact that it is harmful for the environment. Knowing that it was removed for a certain reason, many still don't get the point of removing it. Plastics are not good for our environment, which is one of the reasons why it was prohibited.

This study is significant because of the following reasons: It helped our environment preserve its natural components by lessening the use of petrochemicals in making plastics. It introduced a unique way of application of potato starch by using it as a main ingredient in producing plastics. It lessened the pollutants in our environment by replacing the usual synthetic plastics that are harmful for the environment. It introduced a new topic on which other students can study and research. Scope and Limitations of the Study This study showed that potato can be an ingredient to make a biodegradable plastic.

Alongside wheat and maize, potatoes are important suppliers of starch. The potato starch is a component of non-food products like paper, construction materials, adhesives and many more because of its ability to bind and thicken; starch is an extremely versatile raw material, which has long been an interest to different sectors even outside the food industry. This study was limited only for the investigation of potato starch. It was used as an alternative source for plastic. We, as the researchers, chose to study, if potatoes can be an alternative ingredient to make plastics.

This study can be used to introduce an alternative way of producing plastics which is cheap and at the same time environmental- friendly. It can be used to introduce further work about bio-plastics. This research will cover the intrinsic and extrinsic properties of the potatoes, its advantages, and other related properties, and how it will contribute to the development of the world in industry. This research will cover the properties which are dependent mainly on the chemical composition or structure of the potatoes, its

advantages, other related properties, and how it will contribute to the development of the world in industry.