

Banana By-products in Thailand

Exploring banana by-products feasibility as bioplastics feedstock for food packaging

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We all know that banana, a long shape and very bright yellowish fruit is delicious and good for our health in many ways. But how many people do realize the plant will die after the fruit is harvested and almost 88% of the plant are considered as wastes. By knowing this, will it be better if we could transform these valueless by-products into a valuable bioplastic product?

Studies have claimed that carbon dioxide (CO₂) is one of the greenhouse gases that causes global warming. Plastic, a low cost and high-performance fossil-based polymer, has been used worldwide and is one of the main contributors to greenhouse gas emission. Many countries have made attempts to initiate the curb of plastic production and consumption in which bioplastics is one of the solutions that the market is looking for.

In the context of Thailand, as an agricultural country with 9.9% of the country GDP came from agricultural sector. Banana is one of the top five exported fresh fruits of the country with 1.12 million tonnes produced in 2019. It is one of the easy cultivation plants with little caring required. On the downside, the plant generates a lot of organic wastes are considered valueless and discarded to landfill.

This leads to the purpose of this study in exploring the operational feasibility of utilizing banana cultivation by-products as an alternative raw material in bioplastic production, replacing bio-based feedstock like sugarcane and cassava that is otherwise used as food in Thailand. Following an exploratory study route, both secondary research and qualitative interviews with identified stakeholders involving in both banana cultivation and bioplastics value chains were used to gain an understanding of the situations and to provides new set of data and insights.

Based on the information obtained in this study, banana by-products such as roots, trunks, leaves, and buds a small portion of the by-products can be used for making fertilizers, for human consumption and animal feeds, food wrap, and as decorative in religious-related ceremonies. Whereas most of the by-products are discarded to landfill. The link between banana by-products and bioplastic industry are not found. However, the extraction and transformation process in the value chain could be a potential connecting point for the two value chains. The by-products can be extracted for cellulose and either breakdown into fermentable sugars for bioplastics production or incorporate into existing plastic resins to strengthen its properties.

From the analysis of the operational feasibility, it can be said that the utilization of banana by-products for bioplastics production could be possible, but not in the near future. Even though there are driving forces from government sectors through strategies and policies in promoting the utilization of bioplastic materials and cooperation from producers and manufacturers as well as rising in demand from the consumers and the potential of the banana by-products as an alternative cellulose source. However, there are limitations the slows down the approach from coming into reality such as the permission to enter into market of new bioplastic materials due to legislative issue and requirements that the banana by-products could not reach the satisfaction standard compared with those conventional plastics or existing bio-based materials.

This study could be a good initiation in highlighting the utilization of abundant but valueless agricultural by-products into more useful ways, and this could possibly be applied to other banana growing countries.