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Information Science Competition (InDeLib2022)

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Editors

Asmadi Mohammed Ghazali
Abd Latif Abdul Rahman



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DEVELOPMENT OF BIODEGRADABLE PLASTIC USING *METAPENAEUS INTERMEDIUS*'S SHELL EXTRACT TOWARDS A SUSTAINABLE FUTURE

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Abstract

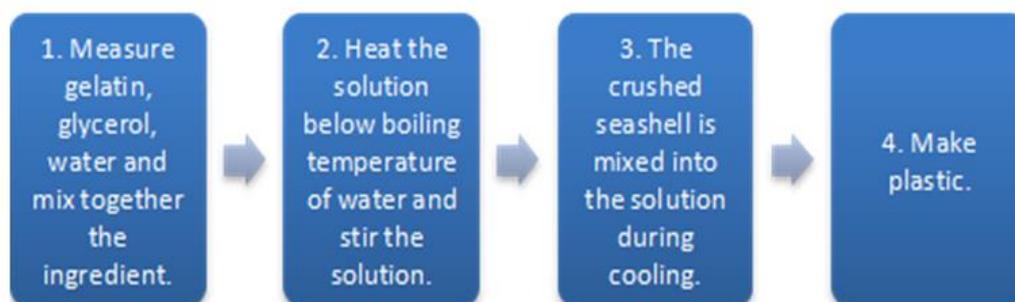
Due to the rise in the use of products made of plastic, the demand for plastic has increased globally, placing additional strain on the waste management system. There is much interest in reducing the usage of plastics made from petroleum, which pollute the environment on a large scale. *Metapenaeus intermedius* (udang kertas) currently has high commercialization potential in the Malaysian market. The high protein content of shrimp is crucial for sustaining and assisting in developing new growth cells. Additionally, it might aid in the replacement of harmed tissue cells. Omega-3 is another component of shrimp that promotes heart health by lowering blood vessel fat levels. The innovation project aims to produce biodegradable plastic using *Metapenaeus intermedius*'s shell extract. Additionally, biodegradable plastic has recently become more popular due to its remarkable biodegradability. It is very simple to bend and can reduce carbon emissions. Biodegradable plastic helps to mitigate the greenhouse impact by not releasing carbon dioxide into the atmosphere. Agricultural, consumer, medical, and automotive industries have all used bio-plastic packaging. Additionally, this novel concept is in line with SDG 14: "Life below water," developed by the United Nations.

Keywords

Biodegradable, Plastic, Marine, *Metapenaeus intermedius*, Sustainability.

Product Description

The growing use of plastic-based products has increased the demand for plastics worldwide and put further strain on the waste management system. Reducing our reliance on plastics made from petroleum, which pollutes the environment worldwide, is a topic of great concern. Through creative redesigning of packaging materials, the annual leakage of more than eight million tons of plastic garbage into the oceans can be reduced. Introducing our biodegradable plastic product develops using the shell of *Metapenaeus intermedius*.



Novelty and Uniqueness

Alternative plastic goods' ability to biodegrade, a trait that traditional plastic will never be able to achieve, even in the future, is their most compelling environmental difference. On average, 6 to 8 metric tonnes of shells are lost yearly. Shells, in particular (*Metapenaeus intermedius*), are an abundant source of chitin and chitosan, which aid in the product's ability to degrade naturally. Since chitin is a polymer, it is a chain of molecules with repeating units. Polymers, comparable molecular chains comprised of repeating units, are also the building blocks of plastics. Chitin comprises between 15 and 40 % of shells, making it a highly desired option for plastic use.

Benefit to Mankind

Biodegradable plastic is more sustainable because it can break down in the environment much faster than conventional plastics, which can take more than 100 years. Engineered biodegradable plastics can degrade in either anaerobic or aerobic environments, depending on how they are produced. Biodegradable plastics are non-toxic since they contain no chemicals or poisons compared to other plastics that can emit dangerous compounds, especially if burned, and decompose more quickly when thrown. They can also be recycled.

Potential Commercialization

Biodegradable plastics make up less than 1% of the world's plastics market, but this sector is expected to proliferate in the next five years. Continuous research and development efforts, rising environmental consciousness and adopting strict environmental legislation drive market expansion. Numerous commercial applications have made use of biodegradable polymers. According to estimates, the biodegradable market is driven by packaging and disposable household items. Foam packaging accounts for a sizable portion of the industry for biodegradable plastics. Foam packaging is followed by compostable bags and single-use carrier plastic bags in volume.

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