

UGM Students Develop Durian Seed Bioplastic

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Students of Universitas Gadjah Mada have developed plastic bags made from durian seeds. The bioplastic is the product made by Fajar Bayu Prakoso, Andika Cahya Widyananda, Annisa Fakhriyah Rofi, Dyah Ayu Permatasari Tedjo Pradipto, and Adiyat, all students of Chemical Engineering.

Fajar Bayu, team chairman, said the product started from their concerns over the increasing use of plastic bags whilst waste management and facility in Indonesia are still lacking that leave the plastic bags scattered everywhere.


Fajar explained the durian seed had been selected due to its high content of starch. The starch can serve as filler so that bioplastic density is high.

“Durian’s starch content is high, almost 50% of the weight, or higher than that of cassava (20%),” he said at Polymer Lab UGM on Friday (11/3).

Fajar and fellow students started the research in 2014 under the guidance of Chemical Engineering lecturer, Prof. Rochmadi. First, they made the seeds into powder by soaking the seeds in lime water for 2-3 days to remove the sap. This was later dried under the sun the whole day. The seeds were separated from the starch and made into powder, using a grinder.

“The powder is filtered and baked in the oven for 30 minutes to remove the water,” he said.

Additional chemicals were given to the powder, including Low Density Polyethylene (LDPE), Maleic Anhydride (MA), initiator (Perbutyl D and Perbutyl Z). The starch was varied with each of these



chemicals. “We made 30 samples to be mixed and moulded using Laboplastomill and Hot Press at LIPI Bandung,” he explained.

Fajar added they had done bioplastic sample testing, including on elasticity and elongation, biodegradability, diffusivity in water, Fourier Transform InfraRed (FTIR) as well as Differential Scanning Calorimetry (DSC) testing. They use 50 grams of sample consisting of LDPE, starch, MAH, and initiator. This produced 3-4 bioplastic sheets measuring 13x13 cm.

“The quality of the product is good with flat surface, no burning out, but this still needs to be made thinner down to 0.5-1 mm,” he added.

The durian seed bioplastic has been kept under the ground for two months. The result showed that it is degradable as marked by the additional weight of the sample, indicating that water has infiltrated into it. In time, the water will degrade the starch content in the bioplastic.

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