

DISINTEGRABLE PLASTICS FROM OIL PALM AND ITS PRODUCTS

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Plastic materials have gained widespread use in the food, clothing, medical, shelter, transportation, construction and leisure industries due to its features of strength, lightweight, easily processable and energy efficient. However, plastics are made of petroleum-based materials called resins (e.g., polyethylene and polypropylene) that are not readily biodegradable.

Each year, tonnes of plastic packaging are discarded as solid waste. The method of disposal for solid waste has been largely through landfilling (90%), recycling (8%) and incineration (2%). Plastics that are disposed in landfill will remain in their original forms for a long time. Their products are therefore not environment-friendly.

MPOB has developed a novel process to produce disintegrable plastics from oil palm and its products together with petroleum-based products.

MANUFACTURING PROCESS

Disintegrable plastics are made on combinations of active ingredients from oil palm and their products and compounded with polyethylene, using the synergy potential of both raw materials, renewable and fossil resources. *Figure 1* illustrates the manufacturing process of disintegrable plastics.

PROPERTIES OF DISINTEGRABLE PLASTICS

The physical and mechanical properties of disintegrable plastics are shown in *Table 1*.

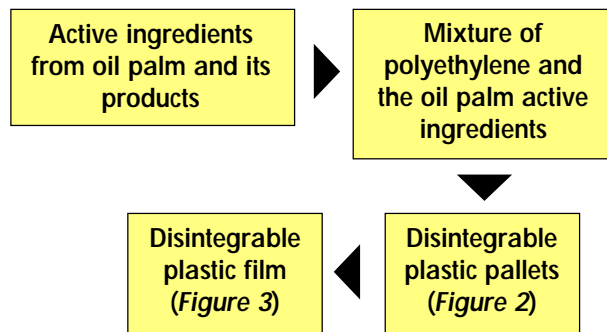


Figure 1. Process flow of disintegrable plastics from oil palm and its products.



Figure 2. Disintegrable plastic pellets.



Figure 3. Disintegrable plastic film.



TABLE 1. PHYSICAL AND MECHANICAL PROPERTIES OF DISINTEGRABLE PLASTICS

Properties	Unit	Disintegrable plastics	Test method used
Density	g cm ⁻³	0.84	ASTM D792
Dart impact test	g	50	ASTM D1709-03
Tensile at break (MD direction)	MPa	54	ASTM D882-02
Tensile at break (TD direction)	MPa	15	ASTM D882-02
Modulus of elasticity (MD direction)	MPa	283	ASTM D882-02
Modulus of elasticity (TD direction)	MPa	248	ASTM D882-02

POTENTIAL END USES

Disintegrable plastics can be used in the following applications:

- carrier bag;
- shopping bag;
- trash bag;
- *bag-on-roll*;
- liners / others;
- packaging material;
- wrapping and shrink film;
- blending component; and
- poly-bags for plant nursery.

COST COMPETITIVENESS

A price increased in crude petroleum will directly raise the production costs of resin polymer. Thus, the use of active ingredients from oil palm and its products will reduce the amount of resin polymer used and therefore the cost of production of the disintegrable plastic.

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