Throw It: A Separation System to Synthesize Biodegradable Plastic from Organic Wastes and Plastic Concrete from Plastic Wastes

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This research mainly focuses on exploiting the concept of Industrial Park by creating an interconnected network of factories. A separation system using artificial intelligence separates wastes through the variations in their refractive indices after calculating it using Snell's law. In addition, a production unit to create plastic concrete from wasted polyvinyl chloride (PVC), high-density polyethylene (HDPE), and other common types of plastics instead of gravel and sand was introduced. This unit physically grinds plastics into fine and coarse particles that resemble sand and gravel. Finally, a unit that utilizes wasted high-starch-content organic materials to create biodegradable plastic was constructed. This unit adds hydrochloric acid (HCl: to break sigma bonds), 1,2,3 triol (glycerol: a cross-linking agent), Sodium Hydroxide (NaOH: a pH regulator), Sodium Metabisulfite (Na2S2O5: a food preservative) to a mixture of starch, banana peels, or potato peels in fixed ratios to synthesize plastic films. The compressive strength, durability, penetration, and toxicity of the plastic concrete samples were by subjecting the plastic concrete to high pressure, immersing the samples in water, and treating it with different acids. Biodegradability and the strength of the biodegradable plastic were tested by putting a biodegradable plastic sample in soil and measuring the decomposition of mass per day. Finally, the acuity of the separation system was tested by exposing the system to a variety of materials. In conclusion, it was found that this solution could introduce a new concept of industry and urbanization in developing countries like Egypt, reduce the effects of ocean pollution caused by plastics, and alleviate the condition of deteriorating ecosystems.

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