

## AI-based Optimization Model for Plastics Biodegradable Substitutes

**Authors :** Zaid Almahmoud, Rana Mahmoud

**Abstract :** To mitigate the environmental impacts of throwing away plastic waste, there has been a recent interest in manufacturing and producing biodegradable plastics. Here, we study a new class of biodegradable plastics which are mixed with external natural additives, including catalytic additives that lead to a successful degradation of the resulting material. To recommend the best alternative among multiple materials, we propose a multi-objective AI model that evaluates the material against multiple objectives given the material properties. As a proof of concept, the AI model was implemented in an expert system and evaluated using multiple materials. Our findings showed that Polyethylene Terephthalate is potentially the best biodegradable plastic substitute based on its material properties. Therefore, it is recommended that governments shift the attention to the use of Polyethylene Terephthalate in the manufacturing of bottles to gain a great environmental and sustainable benefits.

**Keywords :** plastic bottles, expert systems, multi-objective model, biodegradable substitutes

**Conference Title :** ICENS 2023 : International Conference on Engineering and Natural Sciences

**Conference Location :** Montreal, Canada

**Conference Dates :** May 15-16, 2023