Citation: **Sara Ramadan (2024), A comparative study of solid bioplastic containers and containers Styrofoam for fast food packaging, International Design Journal, Vol. 14 No. 6, (November 2024) pp 437-450**

A comparative study of solid bioplastic containers and containers Styrofoam for fast food packaging

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Abstract:

Foam food container is a form of disposable food packaging for various foods and beverages. Consumption of ready meals is increasing around the world. Single-use containers used in ready-meal packaging represent a significant source of waste and environmental impacts due to their low recyclability. Therefore, it is important to identify the best available alternatives and improvement opportunities to reduce the environmental impacts of fast food containers. For these reasons, this study estimates and compares the effects of two types of ready-meal packaging. As a result of global warming and plastic pollution, the demand for alternative biodegradable materials has increased dramatically. Bioplastic is an alternative option being studied to replace traditional petroleum-based plastics to reduce carbon emissions. Since biodegradable plastics decompose faster than petroleum-based plastics, they are expected to reduce plastic pollution. The mechanical properties of these containers remain a challenge to determine whether they are practical to use or weak, making them the first choice whether in manufacturing, use, or even disposal.

Research problem: Thus, the research problem is summarized as follows: 1. Are bioplastic containers less strong and rigid than their counterparts of traditional plastic containers due to them being made from natural materials? 2 . Is there a solution to excessive emissions of greenhouse gases, such as carbon dioxide (CO2). Due to the manufacture of hard plastic containers based on the use of fossil fuels; What increased carbon dioxide concentrations in the air and contributed to the problem of global warming and the climate crisis through the trend towards manufacturing from renewable resources?

Search goal: 1.Proving the strength and rigidity of solid bioplastic containers in the face of their traditional plastic counterparts. 2. Replace fossil raw materials used in manufacturing solid plastic containers with renewable ones. 3.The trend towards sustainable packaging and clarifying the importance of environmentally friendly packaging. 4. Preserving consumer health by obtaining the best safe packaging for fast food packaging.

research importance: 1. Achieving a low-carbon economy. Companies can leverage the advantages of bio-based rigid packaging to decouple their growth from fossil resource consumption and greenhouse gas emissions. 2. The possibility of packaging applications contributing to alleviating or significantly reducing climate change crises. 3. The safe use of the packaging, whether with regard to the properties of use or methods of disposal after use.

sample: Two packages, one of solid bioplastic and the other of expanded polystyrene foam, which are used in fast food packaging.

Methodology: The theoretical study follows the descriptive analytical approach by describing and analyzing the types of expanded polystyrene foam, as well as the types of bioplastics, methods of their decomposition, and the additives required for them during their manufacture, with a review of the mechanics of use for producing containers and the difference between bioplastics and biodegradable ones..

Methodology: The practical study also follows the experimental approach in making some measurements on the two materials under study in order to compare them in terms of the primary components of each and the compressive forces as the most important mechanical properties that differentiate between them.

Results: 1. Although bioplastic is made from natural materials, this does not make it brittle or weak, as it shows greater resistance to penetration. 2.Vital natural materials require specific conditions and specific microorganisms that feed on them to complete the decomposition process. 3. Typical rigid plastic packaging increases the proportion of greenhouse gases and increases the temperature during its manufacture, thus causing an increase in the problems of global warming and the climate change crisis. 4. Solid bioplastic is considered safe for humans in the methods of manufacturing or use, even if migration occurs in any proportion with the foods it is packaged in. It is also safe for the environment in terms of the method of disposal after use, in addition to rapid decomposition, and thus a decrease in the accumulation of waste causing environmental pollution.

Keywords:

Rigid bioplastic, styrofoam, fast food packaging

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Paper History:

Paper received July 25, 2024, Accepted September 28, 2024, Published on line Novebmer 1, 2024

