DOI: http://doi.org/10.21698/simi.2025.ab31

PHYSICO-STRUCTURAL CHARACTERIZATION OF THE CONTAINERS USED IN THE PACKAGING OF FOOD PRODUCTS

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Keywords*: eco-friendly, FTIR, optical microscopy, polystyrene, polypropylene, Raman, sugar cane fiber*

Introduction

Packaging is an essential necessity for any product. Without it, products cannot be stored or transported safely from one place to another. In addition, packaging gives the product its identity and protects it during handling, storage, and transport.

Products made from XPS were not banned by the European Union Directive on Single-Use Plastics, issued in 2019 and entered into force in 2021. This directive aimed to ban containers made of extruded polystyrene (XPS) used as packaging for the food industry – including boxes, caps and lids.

According to Directive (EU) 2024/1069 of the European Parliament and of the Council, food containers made of expanded polystyrene (EPS) or extruded polystyrene (XPS), such as boxes with or without lids, intended for take-away food products, including fast food or ready-to-eat menus, are restricted. However, beverage containers and plates are exempted.

Materials and methods

The casseroles do not change the taste of the food or absorb any of it, they are hygienic, non-toxic, healthy and harmless to the human factor.

Polystyrene packaging is versatile, lightweight and tough. However, to embrace a more sustainable future, companies must find alternative polystyrene packaging solutions. Extruded polypropylene (XPP) food packaging is an innovative alternative to extruded polystyrene (XPS) for their use in food packaging and transportation.

Sugarcane casseroles are a type of ecological and sustainable food packaging, made from natural sugarcane fibers, which are recyclable and biodegradable, and represent an ecological, non-polluting, favorable and environmentally friendly option, optimal for avoiding the use of plastics.

The paper presents the experimental results obtained from testing samples taken manually by cutting, from extruded polypropylene, extruded polystyrene (white, cream, black) casseroles, sugar cane fiber. The correct sampling of the samples was carried out as cleanly as possible, using gloves, because the sampling process has a major importance on the evaluation of the quality of the materials, in order to obtain quality results. After the samples were cut, they were correctly labeled, and

subsequently analyzed by performing FTIR and RAMAN spectroscopy and optical microscopy analyses.

Figure 1. Samples from extruded polypropylene, extruded polystyrene (white, cream, black) casseroles, sugar cane fiber.

Results and conclusions

This paper presents a comparative FTIR study on several types of casseroles: white (XPSa), black (XPSn) and cream (XPSc) extruded polystyrene, extruded polypropylene (XPP) and sugarcane fiber (FTZ).

Chemical analysis was performed on a sample of each material. All casseroles are hygienic, non-toxic, do not alter the taste of food, and are safe for human health.

Polystyrene casseroles include a component that keeps food warm longer and are appreciated for their low weight and thermal efficiency.

Extruded polypropylene (XPP) represents an innovative alternative to polystyrene for food packaging.

In the context of the demand for sustainable packaging, sugarcane fiber casseroles offer an environmentally friendly option. They are compostable, biodegradable and made from recyclable materials.

Microscopic analyses show a uniform dispersion of fibers and a randomly oriented structure. Through their ability to degrade quickly, these casseroles contribute to reducing pollution.

Acknowledgment

Authors from Valahia University of Targoviste, Romania (www.valahia.ro) would like to acknowledge the financial support of the project CNFIS-FDI-2025-F-0421 financed by the Romanian Ministry of Education and Research.