



Thematic section: Research into New Technologies.

Subsection: Medicinal Chemistry.

Full Paper

The Reference Object Identifier – ROI-jbc-C/21-2-4-3

The Digital Object Identifier – DOI: 10.37952/ROI-jbc-C/21-2-4-3

Received 29 November 2021; Accepted 2 Desember 2021

Effect of radiation sterilization on air permeability and structure of Holofiber® nonwoven fabric

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Keywords: polypropylene, gamma radiation, melt flow rate, physical and mechanical characteristics, tensile yield strength, relative elongation, medical devices, sterilization.

Abstract

One of the most demanded polymers in the world is polypropylene, products from which are widely used in many spheres of human life, including for medical purposes, and for contact with food. Due to its chemical resistance, polypropylene occupies a worthy place in the medical industry. It is known that ionizing radiation leads to the destruction of polypropylene, which manifests itself in a decrease in the technical parameters of products based on it. Due to the oxygen present in the polymer, auto-oxidative reactions are possible, which can last for a long time after irradiation of products, contributing to the destruction of the material, which affects its performance.

Polypropylene, intended for the manufacture of disposable containers 400-01030-06 Balen, was chosen as the objects of research. To assess the radiation resistance of polypropylene, the following indicators were selected: melt flow rate, tensile yield strength, elongation at yield point.

Exposure to ionizing radiation with a dose of 20 kGy leads to a significant increase in MFI of PP grade 400-01030-06 "Balen", but the physical and mechanical characteristics do not change significantly – tensile yield stress and deformation at yield stress. Thermal-oxidative aging does not significantly affect the MFR, but leads to a slight increase in the tensile yield strength and deformation at the yield point.

For citation: Maria S. Lisanevich, Reseda Yu. Galimzyanova. Effect of radiation sterilization on air permeability and structure of Holofiber® nonwoven fabric. *Butlerov Communications C*. 2021. Vol.2. No.4. Id.3. DOI: 10.37952/ ROI-jbc-C/21-2-4-3

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