

**CHARACTERIZATION OF MELT FLOW BEHAVIOR IN POLYPROPYLENE  
RANDOM COPOLYMER REINFORCED WITH AGRICULTURAL WASTE**Mustafayeva F. A.<sup>1,2</sup>, *Suleymanli F. S.*<sup>2</sup>, Ibrahimov R. A.<sup>1</sup><sup>1</sup>Institute of Polymer Materials of Ministry of Science and Education Republic of Azerbaijan,  
Sumgayit city, Azerbaijan<sup>2</sup>Sumgait State University, Sumgayit city, Azerbaijan  
fatime.mustafayeva@sdu.edu.az

The utilization of fillers into polypropylene is a well-known method to achieve enhancement in material properties or cost saving possibilities, or both [1]. Agricultural wastes are one of the preferred fillers to produce polymer based composite products would help protect the environment. Polymer composites reinforced with agricultural wastes are attracting more and more attention from researchers due to the lack of toxicity and harmlessness to the environment [2]. In this study, the effect of nano sized corn husk loading on the melt flow index (MFI) of polypropylene random copolymer-based composites has been reported.

Topilene R200P grade (Hyosung Chemical) polypropylene random copolymer with a melt flow index of 0.2 g/10 minutes (at 190 °C temperature and 5 kg load) was selected as the polymer matrix. To improve filler and polymer matrix compatibility and facilitate processing, 2 wt% compatibilizer (Exxelor™ PO 1020, ExxonMobil Chemical) and 1 wt% technological additive (LIBAID T-2, Liberty Chemicals) were used. Corn husk powder with particle sizes  $Dv(10) = 24$  nm,  $Dv(50) = 85.5$  nm,  $Dv(90) = 248$  nm was used as a filler.

MFI is an important parameter to determine the property of the polymer to flow at melting point under the application of the standard weight. The melt MFI was measured by a CEAST MF50 Melt Flow Tester with a load of 5 kg and temperature of 190 °C. During the experiment, studies were conducted on the influence of the mass content of corn husk on the melt flowability. MFIs of the various formulations are shown in Figure 1. After analyzing the results, it can be concluded that with an increase in the content of corn husk, the MFI increases compared to the original polymer matrix. As the amount of filler increases, the MFI remains unchanged. Thus, the MFI of each of the composites containing 1, 3, and 5 wt % nano corn husk powder remained unchanged, equal to 0.6 g / 10 minutes.

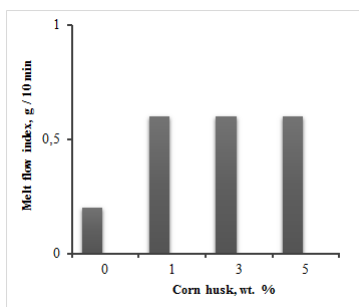


Fig. 1. Melt flow index of polypropylene random copolymer-based composites

**References**

[1] Fayzullin, A. Gorbachev, S. Volfson, et al. Composite Material Based on Polypropylene and Modified Natural Fillers. *Polymers*, 2024, V. 16(12), ID 1703.

[2] G. Pudhupalayam Muthukutti, M.K. Singh, S.K. Palaniappan, et al. Sustainable polymer composites from agro and municipal green wastes: a comprehensive review of materials, properties, and applications. *J Mater Cycles Waste Manag*, 2025, V. 27, P. 3121–3142.