PREPARATION AND CHARACTERIZATION COMPOSITES OF AGAR-GELATIN

Dzeikala O.[1], Sędzikowska N., Prochon M.
[1]Institute of Polymer and Dye Technology, Faculty of Chemistry,
Lodz University of Technology, Lodz, Poland
oleksandra.dzeikala@dokt.p.lodz.pl

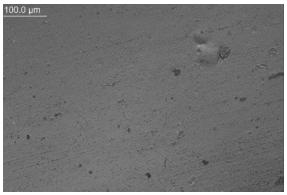
The conducted research is aimed at obtaining a material that decomposes in the last stage of the life cycle and matches the properties of already used materials, e. g. for disposable bags, cups, bottles or other food packaging.

The aim of the work was to produce and test the functional properties of binary gelatin biocomposites with the addition of agar as an additive modifying the gelatin matrix. The advantage of using hybrid blends is their natural origin: animal for gelatin and vegetable for polysaccharides. Gelatine is characterized by low toxicity and carcinogenicity, as well as biocompatibility and biodegradability, and at the same time low mechanical and thermal stability and short degradation time. The target task was to obtain binary hybrids enhancing the above-mentioned properties by cross-linking the gel matrix.

After synthesis and thermal stabilization of the composites, they were tested for mechanical, thermal, functional properties and structural analyses.

The use of film-forming gelatin with the addition of agar allows to obtain a thermally stable composite with good mechanical properties. The addition of agar significantly improved mechanical properties: at the highest concentration, hardness increased by 299 % and tensile strength by 113 % compared to the standard. In addition, agar added to the gel matrix causes an increase in the softening point. Figure 1 below presents SEM pictures of the geopolymer composites made.

The composting process confirmed the ability of biopolymer composites to biodegrade. Tested samples will decompose completely within 11 days.



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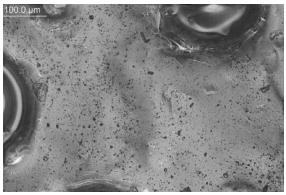

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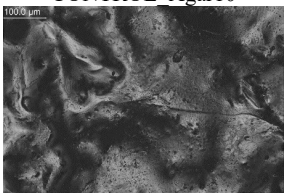

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Fig. 1. SEM photos of biopolymer composites