EMEC23

23rd European Meeting on Environmental Chemistry

3-6 December, 2023, Budva, Montenegro

Book of Abstracts

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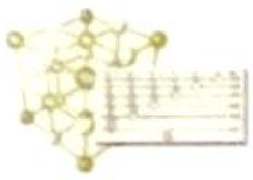

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Investigation of Biodegradability of Levan-Polystyrene Graft Copolymers in Liquid and Solid Medium

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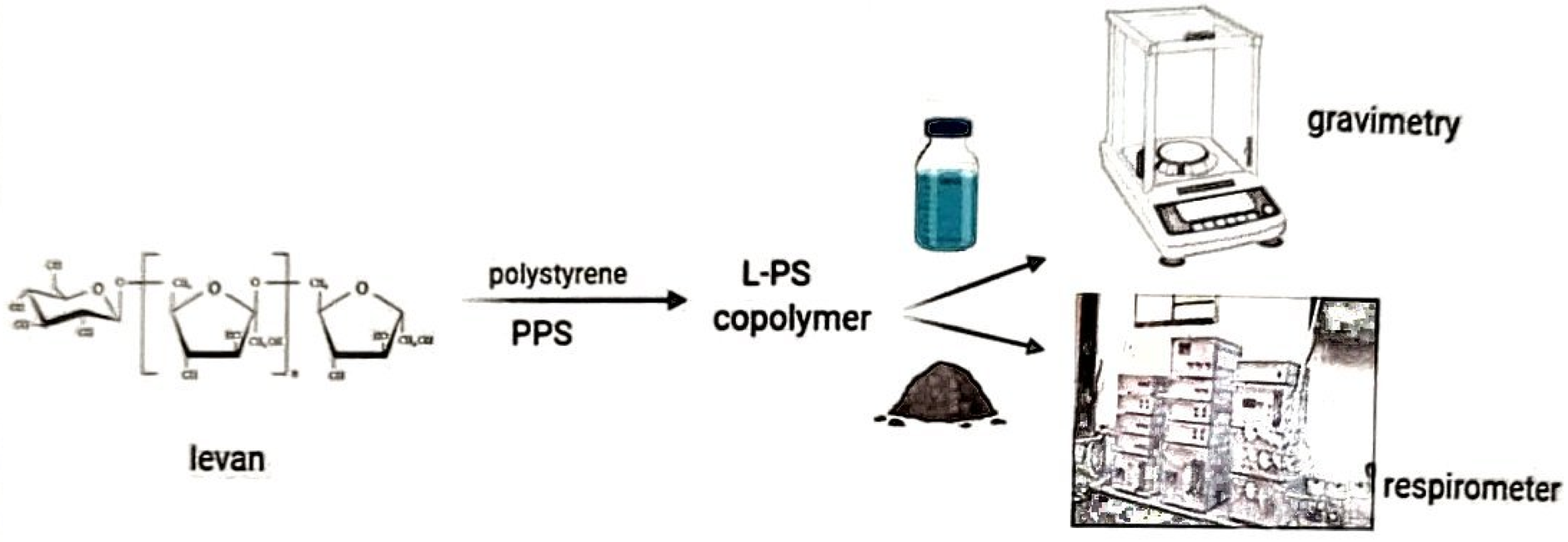

One of the widely used plastic material is polystyrene (PS) due to its low cost, heat resistance and fitting to variety of applications, however it causes environmental concerns [1]. Graft copolymerization combines properties of the polymers involved obtaining specific and improved polymer materials [2].

Levan is a fructose-based polysaccharide that can be produced by various microorganisms, especially strains of *Bacillus*, *Geobacillus*, *Lactobacillus* and *Zymomonas* species. It is a biodegradable, non-toxic and highly biocompatible compound, and therefore suitable for development of novel materials [3].

In the present study graft copolymer with microbial levan and polystyrene was synthetized and its biodegradable potential in liquid and soil medium was investigated.

Levan was isolated using *Bacillus licheniformis* strain. Synthesis of copolymer was performed in nitrogen atmosphere by the free radical reaction using potassium persulfate (PPS) as initiator [4]. Biodegradation in liquid medium was performed in citrate buffer (pH 3.5) at 37 °C for 28 days and monitored by weight loss of copolymer. Soil burial test lasted 30 days with continuously measuring of CO_2 production using Micro-Oxymax respirometer (Columbus Instruments, Ohio).

After 28 days in liquid medium 94 % of total mass of levan-polystyrene copolymer was lost. Cumulative production of CO_2 after respirometric measurements were higher in both levan and copolymer samples (696 and 626 mL, respectively) compared to control (156 mL) and polystyrene (146 mL).

Results of aerobic biodegradation in both liquid and solid medium shows that obtained graft copolymer of levan and polystyrene has biodegradation potential. However, additional tests for biodegradation are needed such as six-month soil burial test.

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