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# Application of microbial levan as a new component for production of graft copolymer with polystyrene

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Polysaccharides based on fructose, also called fructans, are synthesized from sucrose by some plant species and many bacteria, fungi and *Archaea*. Levan is an exopolysaccharide composed of fructose units and has numerous applications in personal care and cosmetics, medicine and food industry<sup>1,2</sup>. Polystyrene is the most widespread polymer for plastic production due to its low costing and easy production. Degradation of polystyrene is long-term process, therefore incorporating natural polymers is the desirable approach<sup>3</sup>.

In the present study, levan-polystyrene graft copolymer (L-g-PS) was synthesized, characterized and influence of reaction time on grafting reaction at two temperatures was investigated. Levan was isolated after cultivation *Bacillus licheniformis* NS032. Syntheses of L-g-PS were performed by the free radical reaction using K<sub>2</sub>S<sub>2</sub>O<sub>8</sub> as initiator<sup>4</sup>. Grafting reactions proceeded in nitrogen atmosphere, at 55°C and 70°C and reaction time ranged between 15 and 210 min. FTIR spectra and XRD patterns were recorded using a Thermo Nicolet 6700 Spectrophotometer and Philips PW-1710 automated diffractometer, respectively.

The formation of L-d-g-PS was confirmed by FTIR spectra which displayed the presence of all characteristic peaks for both component and X-ray diffractograms which showed amorphous nature of copolymer. Compared to other reaction parameters, the temperature of 70°C and time of 45 min was more optimal showing higher percentage of grafting.

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## References

1. Öner TE, Hernández L, Combie J. Review of Levan polysaccharide: From a century of past experiences to future prospects. *Biotechnol Adv* 2016;34:827-44.

2. Srikanth R, Sudhar Reddy HSSC, Siddartha G, Ramaiah JM, Uppuluri BK. Review on production, characterization and applications of microbial levan. *Carbohydr Polym* 2015;120:102-14.
3. Sheikh N, Akhavan A, Ataeviarjovi E. Radiation grafting of styrene on starch with high efficiency. *Radiat Phys Chem* 2013;85:189-92.
4. Kekez et al. Synthesis and characterization of a new type of levan-graft-polystyrene copolymer. *Carbohydr Polym* 2016;154:20-9.