



Slovak Society of Chemical Engineering
Institute of Chemical and Environmental Engineering
Slovak University of Technology in Bratislava

PROCEEDINGS

52nd International Conference of the Slovak Society of Chemical Engineering SSCHE 2026

Hotel SOREA TRIGAN
Štrbské Pleso, Slovakia
May 26 - 29, 2026

Editors: Assoc. prof. Mário Mihaľ

ISBN: 978-80-8208-177-3, EAN: 9788082081773

Published by the Faculty of Chemical and Food Technology, Slovak University of Technology in Bratislava in Slovak Chemistry Library for the Institute of Chemical and Environmental Engineering; Radlinského 9, 812 37 Bratislava, 2026

Poborska, J., Brzozowski, B., Adamczak, M.: Optimization of the enzymatic synthesis of galactooligosaccharides, Editors: Mihaľ, M., In *52nd International Conference of the Slovak Society of Chemical Engineering SSCHE 2026*, Štrbské Pleso, Slovakia, 2026.

Optimization of the enzymatic synthesis of galactooligosaccharides

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Key words: galactooligosaccharides (GOS), β -galactosidase

Galactooligosaccharides (GOS) are prebiotic oligosaccharides that have a beneficial effect on human health by modulating the intestinal microflora. Their prebiotic properties are widely used in the prevention of gastrointestinal diseases, as well as in improving metabolic and immune health. Due to these properties, GOS are used in the food industry, especially in functional foods.

The aim of this study was to analyze the effectiveness of the GOS synthesis using NURICA preparation. The reactions were carried out at 20 °C, 40 °C, and 60 °C, and the process was optimized using the statistical analysis, taking into account selected key parameters for the course of reaction. The reaction kinetics were analyzed using liquid chromatography with a refractometric detector (HPLC-RID) and an evaporative light scattering detector (HPLC-ELSD). The optimal conditions for GOS synthesis in the NURICA-catalyzed reaction are: 40 °C, a lactose concentration of 40%, and a reaction time of 3 hours. As a result of this process, a GOS synthesis yield of 32.28% and a lactose hydrolysis degree of 54.33% were achieved.

Project funded under the designated subsidy of the Minister of Science and Higher Education Republic of Poland, task entitled: The Research Network of Life Sciences Universities for the Development of the Polish Dairy Industry – Research Project.