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In situ transformation of sucrose in maple syrup in order to produce fructo-oligosaccharide enriched product

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It is well known that maple syrup, a product obtained by processing maple tree sap, is widely used in many households due to its sweetness and beneficial ingredients. It is most often used as a topping for pancakes, waffles, donuts, and other desserts, but also as a sweetener for numerous beverages such as coffee, tea, lemonade, and many others. This natural syrup, in which, in addition to numerous minerals, antioxidants, carbohydrates and other components, sucrose predominates, presents an excellent substrate for the synthesis of bioactive molecules, i.e. fructo-oligosaccharides (FOS). These indigestible oligosaccharides which belong to a group of established prebiotics are very suitable from the standpoint of human health because they enable the normal functioning of the gastrointestinal tract, have a positive effect on the immune system as well as many other benefits for the human organism. With the approach which include the conversion of sucrose into FOS, it is possible to obtain a product with improved characteristics, i.e. higher functional and lower caloric values. Accordingly, in this study, a detailed optimization of the enzymatic synthesis of FOS was performed using maple syrup as a source of sucrose and commercial enzyme mixture Pectinex® Ultra SP-L as a source of fructosyltransferase. Namely, by individual varying of enzymatic synthesis key factors such as temperature (30-80 °C), enzyme concentration (1, 3 and 5%) and reaction time (0-25 h), optimal conditions were selected. It was determined that by performing the synthesis reaction at a temperature of 60 °C with an enzyme concentration of 3% for 12h, a remarkable sucrose hydrolysis degree of 82% and a FOS yield of

approximately 55% were achieved. In this case, the estimated caloric value of the obtained product is about 2.2 kcal/mL, which is around 1.6-fold lower compared to the initial value of 3.6 kcal/mL. The product obtained in this manner could represent a low-calorie sweetener with high fiber content and could potentially be included in the diet of diabetics and obese people, as well as all those who aim to maintain better overall health.