MICROBIAL PRODUCTION OF PREBIOTIC SYRUP FROM LONGAN

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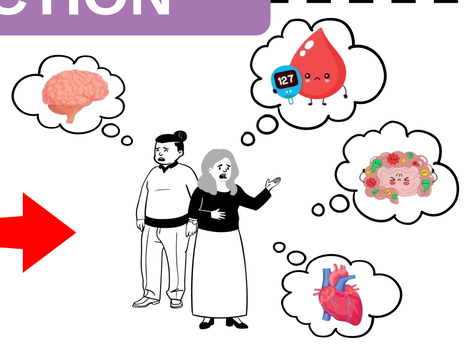
ABSTRACT

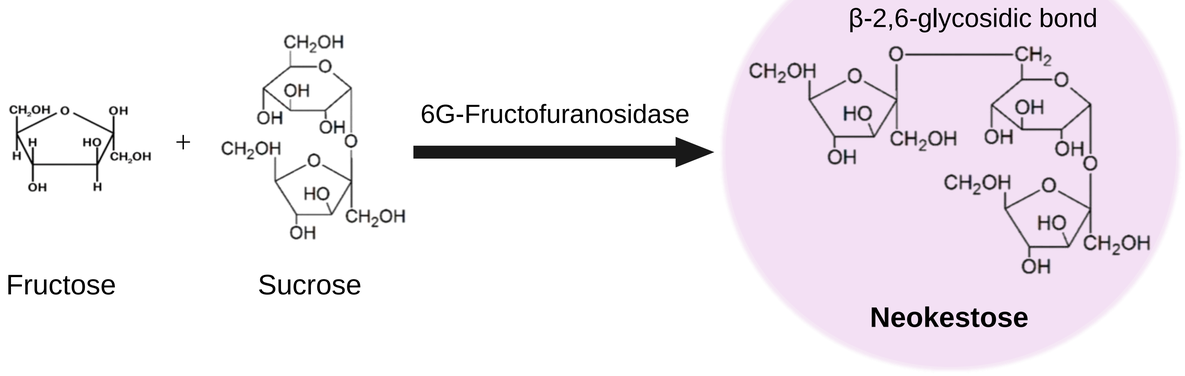
Common syrups are typically made from glucose and fructose, which are high-calorie sweeteners. Consuming these syrups often raises blood sugar levels, increasing the risk of health problems. Developing sweeteners that retain sweetness but provide lower energy is therefore an interesting area of study. Neokestose, a short-chain prebiotic fructooligosaccharide, is a sweetener that offers certain advantages over commercial kestose, such as stability under varying temperatures and pH levels in the digestive system. Neokestose can be synthesized from sucrose through the activity of 6G-fructofuranosidase or by fermentation using the yeast *Xanthophyllomyces dendrorhous*. Fresh longan is a suitable raw material as it primarily contains sucrose, making it ideal for producing low-energy, prebiotic fructooligosaccharide sweeteners. This research aimed to produce a prebiotic syrup containing neokestose from longan using a fermentation method. Longan juice was extracted and analyzed for its sugar content using high-performance liquid chromatography. The results showed that the longan juice contained 199.52 g/L sucrose, 22.13 g/L fructose, and 22.40 g/L glucose. The extracted longan juice was directly fermented with the yeast *X. dendrorhous* TISTR 5730 at 20°C for 24 hours, resulting in a fermented syrup with the following sugar composition (in g/L): 160.30 g/L neokestose, 29.65 g/L fructose, and 30.11 g/L glucose. The optimal temperature for syrup preparation was studied using vacuum evaporation to achieve a syrup with a total solid content of at least 90% of the total weight. It was found that a temperature of 50°C was ideal for syrup preparation, as it preserved the yield of neo-kestose (1,406.38 g/L). Using higher temperatures resulted in a loss of neo-kestose yield. The syrup's color was measured using the CIELAB system, with the following results: L* = 60.79, a* = 25.14, and b* = 65.74. The viscosity of the syrup was measured at 27,535.6 centipoise.

Keywords: Syrup, Longan, Neokestose, *Xanthophyllomyces dendrorhous* TISTR 5730, Prebiotic

INTRODUCTION

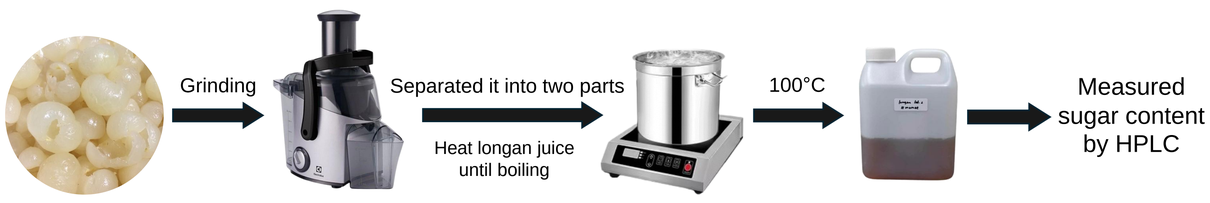


Regular high sugar consumption increases the risk of Non-Communicable Diseases (NCDs)

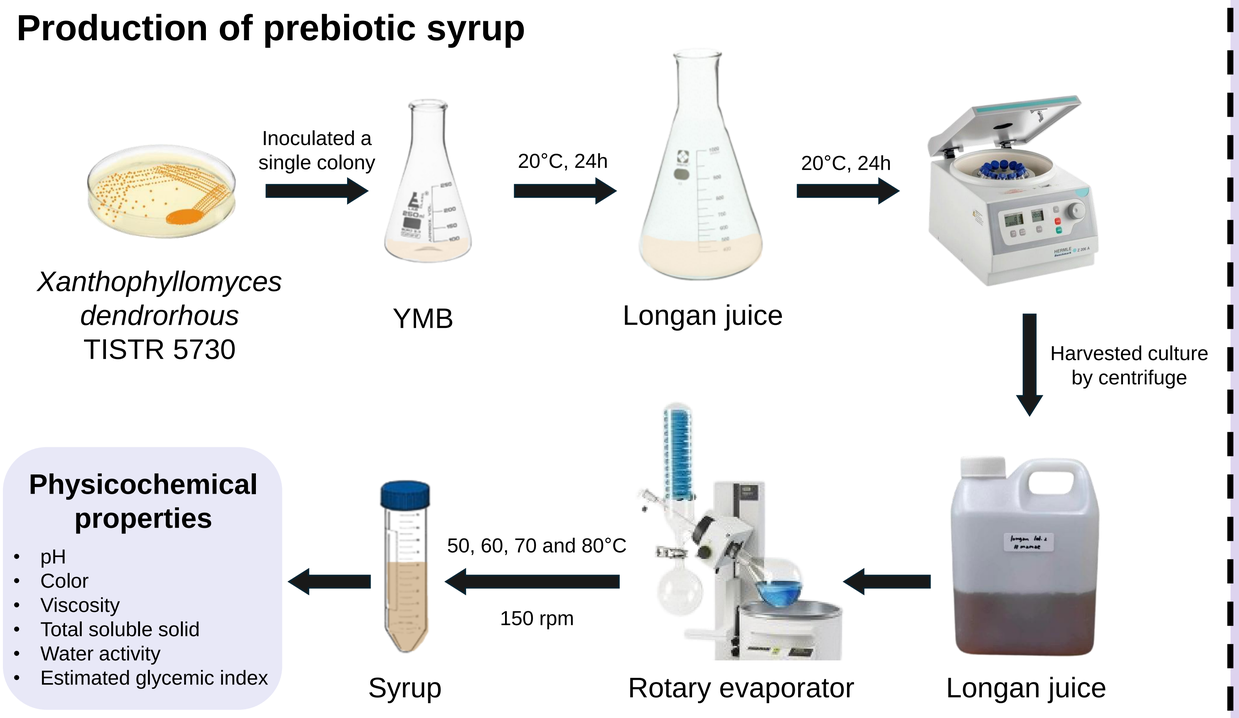


METHODOLOGY

Preparation and extraction of longan juice



Production of prebiotic syrup



RESULTS

Table 1 Sugar composition and contents of longan juice before and after fermentation

Sugar	Before	After
Sucrose	160.31 g/L	15.54 g/L
Fructose	29.65 g/L	23.02 g/L
Glucose	30.11 g/L	51.54 g/L
Nekestose	-	123.89 g/L

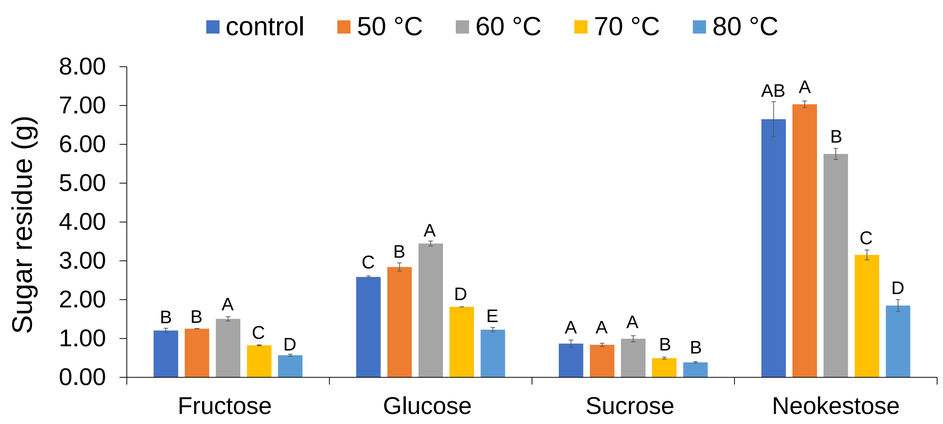


Fig. 1 The sugar residues fluctuated at various temperatures

Table 2 Physicochemical properties of syrup at 50°C evaporation temperature

Sugar content (g/L)				Color parameters		
Fructose	Glucose	Sucrose	Neokestose	L*	a*	b*
239.57	443.70	162.64	1,034.66	60.79	25.14	65.74

Moisture content (%)	Total solid (%Brix)	A_w	Viscosity (cP)	eGI
8.27	88.80	0.63	27,535.6	31.80

CONCLUSIONS

The temperature of 50°C was the optimal temperature for syrup preparation without loss of neokestose content

The syrup prepared under the optimal conditions appeared dark brown color and had a suitable water activity of 0.63 and viscosity of 27,535.6 cP

REFERENCE

Sheu, D. C., Chang, J. Y., Chen, Y. J., and Lee, C. W. (2013). Production of high-purity neofructooligosaccharides by culture of *Xanthophyllomyces dendrorhous*. ***Bioresource Technology***, 132: 432-435.

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