

Title : Enzymatic Production of Prebiotic Syrup from Longan

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## ABSTRACT

Syrups are important ingredients in beverage preparation. Most commercial syrups are instant glucose and fructose syrups which are easily soluble, thus being convenient and time-saving. However, excessive consumption of these syrups may lead to health problems, such as hyperglycemia and non-communicable diseases. Therefore, the development of low-energy syrups is an attractive option for health-conscious consumers. Longan is an economic fruit in Thailand, and its main sugar component is sucrose, which can be used as a raw material for the production of fructooligosaccharide. Sucrose can be converted into fructooligosaccharides through enzymatic methods. Inulosucrase is the key enzyme capable of converting sucrose into 1-kestose, the shortest-chain fructooligosaccharide which in turns can be acted as a sweetener. This research aimed to prepare a prebiotic syrup containing 1-kestose from longan using enzymatic methods. Longan juice was extracted, and its sugar composition was analyzed by high-performance liquid chromatography. The longan juice contained 160.3 g/L sucrose, 29.6 g/L fructose, and 30.1 g/L glucose, indicating a suitable substrate for 1-kestose production. It was prepared to have initial sucrose concentrations of 400 g/L using a vacuum evaporator. To investigate optimal conditions for bioconversion of concentrated longan juice into 1-kestose. The concentrated longan juice was varied to initial sucrose concentrations of 200 and 400 g/L. Effect of inulosucrase dosages on 1-kestose production was investigated by subjecting different dosages of inulosucrase (1, 5, and 10 U/g sucrose) to 200 g/L and 400 g/L of concentrated longan juice. The reaction was carried out on a 150 rpm-rotary shaker incubator at 45°C for 6 h. The optimal conditions were as follows: initial sucrose concentration of 200 g/L, temperature of 45°C, agitation speed of 150 rpm, reaction time of 3 h. Under optimal conditions, the resulting product consisted of 1-kestose 94.0 g/L, glucose 94.9 g/L, fructose 28.9 g/L, and sucrose 55.0 g/L. The product was evaporated at 50 °C until reaching a final total solid of more than 90%. The final product appeared dark brown in color with longan flavor and had a L\* value of 61.02, a\* value of 21.24 and b\* value of 64.37. Its viscosity was 24323 centipoise and had a water activity value of 0.64.

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