

Quality Evaluation of Maltose Syrup Produced from Cassava (*Manihot esculenta* Crantz) Starch using Malted Rice (*Oryza sativa* L.)

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Abstract

The study aimed to evaluate the quality of the maltose syrups from Rayong 9 cv. cassava using malted rice Sen Pidao cv. as source of amylase enzymes. The proximate composition of fresh (12-month old) cassava starch was determined. Paddy rice seeds (Sen Pidao cv.) were germinated for 10 days under ordinary room temperature, and the alpha-amylase activity was determined daily together with measurements of shoots and roots length (cm). Significant increase in α -amylase activity was observed on day 8.

Maltose syrups from cassava starch were prepared using 8-day old malted rice. Two different treatments with varying malted rice concentration (T1: 200g cassava starch: 32 g malted rice; T2 200 g cassava starch: 48 g malted rice) were prepared. The mixtures were adjusted to various pH levels (unadjusted, 4.0, 4.5, 5.0, 5.5, 6.0 and 6.5). Saccharification time was extended overnight to maximize starch hydrolysis. The resulting syrups were evaluated for their physicochemical properties [color, pH, moisture content, total soluble solids (TSS), % reducing sugar (RS), dextrose equivalent (DE), crude ash and crude protein]. The yield of maltose syrups from different treatments was recorded. The resulting products were subjected to sensory evaluation.

T1 and T2, without pH adjustment (pH 5.3), obtained higher RS and DE values among samples. Results suggest that pH adjustment within the range of 5.0-5.5, and the use of higher malted rice resulted in high RS and DE of maltose syrup.

An eight-hour saccharification period of extracted juice with additional overnight storage resulted in decreased pH values for both T1 and T2. Moisture content of maltose syrups ranged from 4.65–11.79%. The presence of crude protein in syrups can be attributed to incomplete washing of starch, and this contributed to the browning reactions observed. In terms of color, the *L*- values signified that the more acidic the sample, the lighter is the color. Varying the amount of malted rice did not affect the color lightness of the products. Samples from pH 4 show significantly higher yield than the rest of the syrups.

Sensory evaluation shows that the color of the maltose syrup range from light brown to dark brown; and browning intensity increases with increasing pH and malted rice. Samples have lighter color compared to local product. All samples suggest lower viscosity than the local product particularly at lower pH values. Aroma of the syrup from lower pH levels had less intensity than those from higher pH levels. Syrups from T1 and T2 have better aroma than the

local product. In general, syrups studied are more acceptable than the local syrup, especially when the amount of malted rice is increased.