

EFFECT OF TEMPERATURE AND TIME ON DRY GRANULATION PROCESS OF ARENGA PALM SUGAR

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ABSTRACT

The purpose of this study was to determine the physico-chemical, structure and morphology properties of arenga palm sugar blocks and granule and to analyse phenomenon on dry granulation of arenga palm sugar granule. Arenga palm sugar block was prepared by heating sap until temperature of 118 ± 2 °C, then it was poured into wood mold and cooled to form solid state (arenga palm sugar block, GAC). The GAC, then was sized reduction and heated at temperature of 70, 80 and 90 °C and every 5 minutes it was stirred and observed its changes until 45th minute to produce arenga palm sugar granule (GAG). The arenga palm sugar granule by wet granulation was used as a control (GAG-control). Physico-chemical of arenga palm sugar block consisted of 10.1% db of moisture content, 3.2%db of reducing sugar and 92.5%db of sucrose was successfully used to produce palm sugar granule by dry granulation. The arenga palm sugar block with its crystallinity of 63-66% increased its crystallinity into 75% at 20th minute and then decreased into 72% at the end of the granulation process. Generally, morphological structure of arenga palm sugar block consisted of crystal particles wrapped by a dough-like binder. During granulation, the binder volume decreased due to moisture loss then granule surface was rougher than the initial one. Arenga palm granule by dry granulation had a higher transmittance than wet granulation, and dry granulation did not cause a dramatical change on functional group of the product. The granulation process (particle formation) occurs when moisture of the material reached around a multilayer water condition.

KEYWORDS: Arenga Palm Sugar Block, Arenga Palm Sugar Granule, Crystallinity, Microstructure, Morphology, Multilayer