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Effect of Furnacing Time Periods and Temperature on Purity of Quick Lime for the Production of palmyrah (*Borassus flabellifer*) jaggery

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Abstract

Quick lime is commonly used additive in Sri Lanka during the period of palmyrah (*Borassus flabellifer*) sweet sap collection to delay sap fermentation by natural yeast and bacteria. There are several palmyrah sweet sap based products as jaggery, treacle, sugar candy and sugar produced in northern Sri Lanka which shows poor keeping qualities and large variation in physicochemical characteristics among batches. Quality of the above products mainly connects with collection of raw material. Local tappers who are following poor quality control practices as applying excess amount of quick lime with low purity that is adulterated by impurities as sand and ash. In Jaffna two traditional kilns present in Pandaiththrippu and Anaikkoddai are producing quick lime from sea shells using coconut husk charcoal. Purity of quick lime expressed as CaO (g/100g) produced from Anaikkoddai kiln was 59.99 ± 0.97 and Pandaitharippu kiln was 42.34 ± 0.74 . Quick lime produced from both kilns were not in suitable condition to be used during processing of palmyrah sweet sap for the production of standardized palmyrah sweet sap based products. Hence this research was designed as two factor factorial design of experiment. Temperature (750 °C, 850 °C, 950 °C and 1000 °C) and time period (10, 20 and 30 minutes) combinations of treatments were carried out to produce high purity quick lime through furnacing of sea shells. Purities of quick lime obtained were statistically analyzed using SAS package. Significant differences were observed among all selected temperatures and time periods. Significantly highest value for quick lime purity was obtained in 1000 °C and 30 minutes. Application of the treatments 1000 °C for 20 minutes, 1000 °C for 30 minutes, 950 °C for 30 minutes and 850 °C for 30 minutes were produced significantly same and higher purity of quick lime compared to other of treatments. According to high energy consumption 850 °C for 30 minutes treatment was selected to produce quick lime with 96.02 ± 0.06 % of purity.

Key words: kiln, palmyrah (*Borassus flabellifer*), quick lime, and sweet sap