

## INTRODUCING AN EFFICIENT MOISTURE REMOVAL METHOD FOR KITHUL TREACLE AND JAGGERY PRODUCTION INDUSTRY IN SRI LANKA

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In Sri Lanka, treacle and jaggery are considered to be important traditional sources of sweeteners. Sap of the *kitul* palms (*Caryota urens*) is used to produce treacle and jaggeries, which have high nutritional and export market values. In the whole traditional treacle production process, moisture removing step consumes more time, labor and energy. There is no new mechanical application for rapid removal of moisture other than traditional method. Therefore, the aim of this study was to develop a suitable device for an efficient moisture removal from the sap. Pressure controlling unit, moisture removing unit and stirring unit which had been fitted to a well-sealed 8 L aluminum container were the components of this device. The most salient feature of this device was, ability of controlling the inside pressure of the container to enhance the removal of moisture under low temperature. A flexible tube with a non-return valve was fitted to the lid of the container as the moisture removal unit. Vacuum pump, vacuum gauge, a flexible tube and non-return valves were the components of the pressure controlling unit. Stirring mechanism was attached to the center of the lid in order to stir the sap when it is required. The performance of the device was evaluated with *Kitul* sap over the manual method with five replicates for each process using gas and firewood as energy sources. When gas was used as the energy source, the average times taken for the initiation of the moisture removing, duration of moisture removing and total process has been reduced by 36%, 37.91% and 30.97% respectively compared to the traditional method. Those values were computed as 44.1%, 27.87% and 24.46%, respectively when firewood was used. Firewood can be saved by 30% with the new method. The statistical comparison revealed that new method has significantly performed better than the traditional method ( $p < 0.05$ ) and gas is the best energy source for the new method. Hence, it is concluded that, newly introduced method can efficiently replace the traditional method. It is suggested that, efficiency of the new device can be increased with a fully automated pressure controlling unit.

**Keywords:** *Kitul* treacle, *Kitul* jaggery, Moisture removing, Pressure controlling