Studies on copra drying for white coconut oil production

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Introduction

Currently, copra is produced at a relatively small scale using a traditional process which involves a high degree of manual labour. Copra production relatively takes longer time to dry and it is a time consuming process. Sri Lanka, as a copra exporter in the world, it is needed to find out new copra production methods, which give relatively high quality copra in order to produce high quality coconut oil. Therefore it is needed to conduct studies on higher scale production process which is more cost-effective than the current process, and which will give a consistently high quality milling copra. This is to evaluate the effect of de-shelling on the copra drying process compared to previously conducted trials. Therefore de-shelled coconut kernel is to dry in an indirect heated copra dryer in Pannala area which is belong to Adamjee Lukmanjee & Sons (Pvt) Ltd and to obtain good quality product and evaluating the product via standard quality parameters.

Methodology

Drying experiments were carried out at Adamjee Lukmanjee & Sons (Pvt) Ltd. laboratory and the hot air dryer located at the Pannala area which belongs to Adamjee Lukmanjee & Sons (Pvt) Ltd. The research work was done as two parts. First laboratory scale experiment was done to produce de-shelled copra and the next step was to do a trial run in large scale. In the current study, coconut nuts were de-shelled and separated into three sizes as the cup size, half of the cup and quarter of the cup as three replicates of each treatment. Normal cup size copra was used as the reference. Drying time which takes to remove moisture content upto 6% from the coconut kernel was recorded in each treatment. Then quality parameters of each treatment were evaluated to obtain good quality copra product through the process of drying the de-shelled coconut nuts. These properties such as: Total plate count (TPC), Yeast and mould (Y&M) and Free fatty acid (FFA) content of de-shelled copra was measured by keeping one month period of time under typical storage facilities. Free Fatty Acid levels in each replicates were measured for chemical analysis. Trial was conducted using 10,000 coconut nuts to prepare de-shelled copra. All experimental data with three replicates were analysed with one way ANOVA using Minitab 16 statistical software. All comparisons were based on a 95% confidence interval. Mean comparison was done using Tukey test.

Results and Discussion

According to the drying time evaluation, there is a significant difference ($P < 0.05$) with the control sample. Cup copra with the shell gives the highest time to dry out the kernel to 6 % moisture. Free fatty acid content in the de-shelled copra is higher than the reference. This can be due do the removal of the shell. But FFA is at the required level of standard milling copra used to make oil. Total plate count is lower in control treatment. It can be noted that highest TPC resulted in the cup copra without shell. This can be due to the external factors affect during the

storage time period. Though TPC is lower in control treatment, Y & M has increased in that treatment. This can be highly susceptible for yeast and mould growth. Half size copra sample is comparable to the control sample and the other two treatments are different. All the treatment levels are at the required range of this quality parameter.

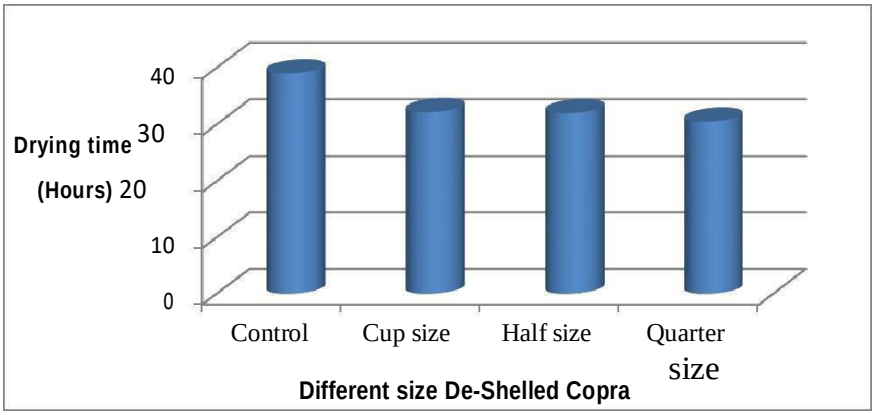
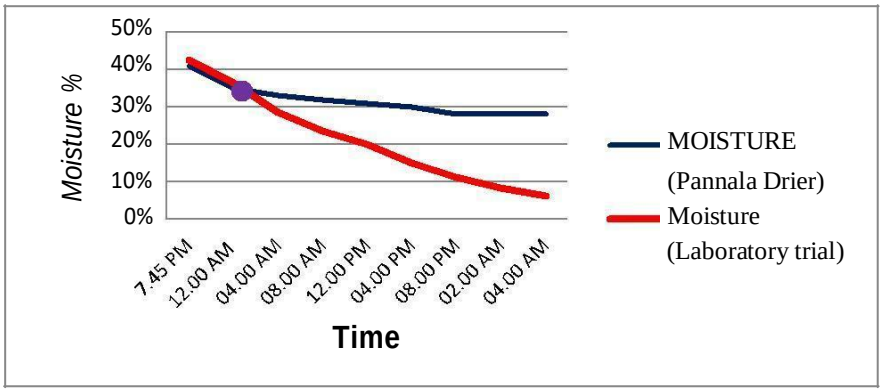


Figure 01: Drying time of De-shelled copra

Table 01: Keeping Quality Parameters of De-shelled Copra

Parameter	Treatments			
	Control	Cup size	Half size	Quarter size
FFA	0.83	0.64	0.54	0.18
TPC	554.00	2917.00	1763.00	1819.30
Yeast and Mould	20.16	14.33	23.66	11.00

In the next part of the study, large scale trial run was done to produce de-shelled copra with the help of indirect hot air dryer. Hot Air dryer performed well at the beginning but, with the time after 4 hours the dryer was malfunctioned. Initially 55 ^{o}C of temperature showed inside the chamber. When the drier get malfunctioned, temperature fell up to 35 – 40 C of temperature. Therefore, required moisture content of 6 % does not appear within the calculated time.



Pannala dryer get malfunctioned

Figure 02: Comparison of Moisture Reduction

Conclusions

These studies covers on advance test methods related to copra production. Instead of the conventional process of copra drying, new studies were carried out by using indirect heated hot air dryers. This method helps to produce copra within short period of time compare to conventional drying. Cup size of de-shelled copra is easy of processing and handling compare to other two sizes.

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