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Effect of selected pre-treatments with freeze drying on final quality of dehydrated banana (*Musa spp.*) and mango (*Mangifera indica*)

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Abstract

Fruits are perishable commodities which are short lived. Bananas and mango are fruits which are very popular among Sri Lankans. These two fruits abundantly cultivated in Sri Lanka and huge postharvest losses can be seen due to poor handling. Freeze-drying is an advanced technique which can be used for fruit drying and it preserves their quality while extending shelf-life. With a view of identifying the most appropriate pretreatment for freeze drying of fruits, a study was conducted using two fruit samples, namely, banana (var. Sugar) and mango (var. Villard), which were treated with four different pretreatments, T1: hot water blanching (fruit slices were dipped in 60°C boiled water for 3 min), T2: steam blanching for 2 min, T3: dipped in Citric acid solution (2 g/L) for 2 min and T4: dipped in Sodium metabisulphite (SMS) solution (2 g/L) for 2 min and then freeze dried. An untreated fruit sample (T5) was used as a control. Quality evaluation of freeze-dried samples was done by taking below mentioned parameters; total colour difference, total soluble solid content (TSS), moisture percentage, beta carotene value (mg/100g), Antioxidant value (mg/100g), ascorbic acid content (AA) (mg/100g), total phenolic compound (TPC) (mg GAE/100 g). The experimental design was a complete randomized design (CRD) with three replicates. The results indicated that the significantly lowest ($p < 0.05$) color difference (3.19 ± 2.08) and moisture content (8.51 ± 0.21) were observed in citric acid-treated freeze-dried banana fruit samples. However, Antioxidant value, beta carotene and AA content were significantly higher ($p < 0.05$) in the T3 banana fruit sample (9.27 ± 0.03 ; 1.02 ± 0.01 ; 5.98 ± 0.04), as well it has significantly high ($p < 0.05$) values for TSS and TPC compared with the control. According to the data, the lowest color difference (8.60 ± 0.12) and moisture content (8.92 ± 0.08) were observed in T2 mango samples. AA (63.25 ± 0.13) and TPC (119.4 ± 0.76) showed significantly high ($p < 0.05$) values in SMS added mangoes and Beta carotene (23.12 ± 0.28) and antioxidants (4.96 ± 0.06) were highest in steam-blanching samples, however there was no significant difference among T2 and T4 mango samples. Citric acid treatment (T3) is very suitable for bananas, as SMS treatment (T4) is much more suitable for mango. Pretreatments play important role in dehydration while preventing loss of color, valuable bioactive compounds and improving rehydration characteristics. Although freeze-drying is costly it produce high-quality final product with extended shelf life, resulting increases demand for freeze-dried products.

Key words: Banana, Freeze drying, Mango, Pretreatments, Shelf-life

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