ABSTRACT

Preservation of the Breadnut/Chataigne (*Artocarpus altilis*) through Refrigeration and Dehydration

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Breadnut or chataigne, the seeded type of breadfruit (*Artocarpus altilis*) is used principally as a vegetable in the partially immature, firm, green stage and the seeds alone are utilized from the ripe form. In a storage trial, the partially immature breadnut, suitable for cooking was stored for 25 days at 10°C and 16°C and 9 days at 28°C (ambient conditions). Fruits were either packaged in sealed polyethylene bags or waxing. A storage life up to 25 days was achieved for packaged fruits held at 16°C. For short-term storage under ambient condition, sealed polyethylene bags extended post harvest life from 3-4 days to 9 days. Waxing was not successful in extending shelf life compared to packaged fruits in cold storage. Chilling injury, manifested as browning of the seeds, was observed at 10°C and 16°C after 4 days.

The drying and rehydration characteristics of the mature seeds were also assessed, as a means of developing a new product from the underutilised crop. The results indicated that drying of the in-shell seeds and kernels takes place exclusively in the falling rate period. The thin-layer drying characteristics of pretreated and untreated in-shell seeds and kernels within a temperature range of 35°C-80°C and a flow rate of 1.2 m/s can best be described by a two-term solution of the

diffusion equation. The temperature dependence of the drying rate constants was further demonstrated by an Arrhenius-type relationship. Results also show the importance of the shell as a constraint to moisture transfer from the kernel.

Rehydration and water absorption during the soaking of untreated and pretreated, dehydrated breadnut seeds at 28°C, 70°C and 100°C was studied. Peleg's equation was used to model this behaviour. The two constants, K_1 and K_2 in the equation were obtained as well as their temperature dependence using an Arrhenius equation. The reciprocal of K_1 equates the hydration rate whereas K_2 could be used as a water absorption parameter. The floating nature of the dried seeds caused incomplete rehydration. The pretreated dehydrated seed material showed a higher absorption rate as compared to the untreated.

Pretreated seeds dried at 50°C were evaluated by a taste panel for their level of acceptance when rehydrated for 45 and 60 min at 100°C. The freshly cooked seeds showed higher sensory ratings for texture, taste, and overall acceptability as compared to the 45 and 60 min reconstituted seeds. However, some potential was noted for the 60 min reconstituted seeds.

Keywords: Lisa P. Harrynanan; breadnut; *Artocarpus altilis*; storage; drying; rehydration; two-term model of the diffusion equation; Peleg's equation.