

Mango (*Mangifera indica* L.) Lyophilization Using Vacuum-Induced Freezing

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Abstract : Lyophilization, also called freeze-drying, is an important dehydration technique mainly used for pharmaceuticals. Food industry also uses lyophilization when it is important to retain most of the nutritional quality, taste, shape and size of dried products and to extend their shelf life. Vacuum-Induced during freezing cycle (VI) has been used in order to control ice nucleation and, consequently, to reduce the time of primary drying cycle of pharmaceuticals preserving quality properties of the final product. This procedure has not been applied in freeze drying of foods. The present work aims to investigate the effect of VI on the lyophilization drying time, final moisture content, density and reconstititional properties of mango (*Mangifera indica* L.) slices (MS) and mango pulp-maltodextrin dispersions (MPM) (30% concentration of total solids). Control samples were run at each freezing rate without using induced vacuum. The lyophilization endpoint was the same for all treatments (constant difference between capacitance and Pirani vacuum gauges). From the experimental results it can be concluded that at the high freezing rate (0.4°C/min) reduced the overall process time up to 30% comparing process time required for the control and VI of the lower freeze rate (0.1°C/min) without affecting the quality characteristics of the dried product, which yields a reduction in costs and energy consumption for MS and MPM freeze drying. Controls and samples treated with VI at freezing rate of 0.4°C/min in MS showed similar results in moisture and density parameters. Furthermore, results from MPM dispersion showed favorable values when VI was applied because dried product with low moisture content and low density was obtained at shorter process time compared with the control. There were not found significant differences between reconstititional properties (rehydration for MS and solubility for MPM) of freeze dried mango resulting from controls, and VI treatments.

Keywords : drying time, lyophilization, mango, vacuum induced freezing

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