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Physical and chemical stability of refractance Window®- dried mango (Philippine 'Carabao' var.) powder during storage

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Abstract

Refractance Window® (RW) drying is a novel drying method that has been proven to produce high quality food powders. However, information on the stability of RW-dried products during long-term storage is lacking. In this study, the effect of packaging atmosphere, storage temperature and time on the physical and chemical stability of RW-dried mango powder was evaluated over 12 months. RW-dried mango powder with a water content of 0.037±0.001 kg water/kg dry solids was stored at 5, 22 and 45ºC for 12 months using air-filled or nitrogen-flushed packaging. Headspace in the package, water content, color, ascorbic acid, β-carotene and microstructures of powder were measured at 0, 6 and 12 months. The mango powder stored at 45ºC suffered discoloration and ascorbic acid (AA) and β-carotene degradation after 6 and 12 months of storage in both air-filled packaging and nitrogen-flushed packaging. The powder stored at 5 and 22ºC had lower nutrient losses and color was retained. Replacing the air inside the package with nitrogen gas was effective in preserving AA in mango powder stored at 5 and 22ºC. Nitrogen flushing also reduced the loss of β-carotene after 6 months of storage. The initial microstructure of mango powder stored at 5 and 22ºC was preserved after 6 and 12 months. Nitrogen-flushed packaging of mango powder at 5 & 22ºC stored for 6 months is recommended in this study to minimize degradation of nutrients during long term storage.

Biography

Ofero A. Caparino has completed his Ph.D. in Biological and Agricultural Engineering/Food Engineering at Washington State University (WSU), Pullman Campus, under the auspices of the Ford Foundation International Fellowship Program-International Institute of Education, New York, USA, and WSU Graduate Research Assistantship Program. He was a recipient of the British Council Scholarship Program and the Philippines Bureau of Agricultural Research Scholarship Program for his Diploma in Agricultural Education and Master of Science in Agricultural Engineering, respectively. Currently, he is the Chief of the Bioprocess Engineering Division of the Philippine Center for Postharvest Development and Mechanization (PhilMech), Philippines.

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