Development of technology for production of value added β-carotene rich mango powder

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ABSTRACT

An experiment entitled "**Development of technology for production of value added β-carotene rich mango powder**" was conducted at the Division of Post Harvest Technology, IARI, New Delhi during 2005-2007. Three mango varieties namely, cv. *Langra*, *Dashehari* and *Banganpalli* and two carrot varieties, namely, cv. *Nantes* (yellow) and *Pusa Kesar* (red) were selected to conduct the experiment.

To standardize the mango and carrot pulp blend for high ß-carotene content, the blend of (50:50) Langra and Dashehari was blended with yellow and red carrot pulp in the proportion of 50:50:0, 45:45:10, 40:40:20, 35:35:30, 30:30:40. The proportion of 40:40:20 was selected as best for both yellow and red carrot pulp blends as it contain high β-carotene content and good colour without change of mango flavour and taste in the blend.

To optimize the pretreatments for retaining high amount of β-carotene and functional properties of powder, the blends of mango and carrot pulp was treated with different treatments of 0.1 % CA, 0.1 % KMS, 0.05 % BHA, 0.1 % CA + 0.1 % KMS and 0.1 % CA + 0.05 % BHA, then dried at 60 ± 2 ^{o}C in a cabinet dryer, up to 4-5 % moisture content and it was converted into powder form. On the basis of nutritional quality assessment, the treatment 0.1 % CA + 0.05 % BHA was found to be good as compared to other treatments. Further to find out the best combinations of TP and MD for reducing levels of stickiness, degree of caking, hygroscopicity, and free flow-ability of the powder, the treatment of 1.5 % TP + 2.5 % MD for yellow carrot pulp and 1.5 % TP + 5 % MD for red carrot pulp was found to be better as compared to the other treatments and control.

To find out the most appropriate drying conditions, the treated blends of mango and carrot pulp was subjected for drying in three drying conditions i.e. cabinet dryer, solar dryer and low temperature dryer. Among them, cabinet dryer was found more suitable as it took less time to dry the material to a low moisture content at which powder could easily be prepared and also retained high amount of ascorbic acid and β-carotene content in the powder as compared to others.

Out of three layers of thickness i.e. 1.6 mm, 2.4mm and 3.2 mm tried for faster drying of mango and carrot blends, the thickness of 2.4 mm was found to be most suitable for

drying these blends in comparison of less and more thickness as less thickness (1.6 mm) was not found economically viable and more (3.2 mm) thickness took more time to dry the product.

With regard to packaging materials, used for the storage study of value added β-carotene rich mango powders. ALPE260g pouches packed with either atmosphere or nitrogen gas followed by storage at low temperature was found to be the best for retaining better quality of β-carotene rich mango powder during storage, among the other packaging material of ALPE260g, HDPE200g, LDPE200g and LDPE400g pouches. The total carotenoids/β-carotene, ascorbic acid, total sugars, total phenol, antioxidant powder and sensory score decreased with an advancement of storage period while moisture, acidity, reducing sugars and NEB increased for the same period. Ascorbic acid and β-carotene degradation during storage in the powder were found to be followed in 1^{st}-order reaction.