

Research Note

THE STABILITY OF β -CAROTENE IN MANGO NECTAR¹

Studies have shown that the consumption of yellow fruits reduces cancer risk. This effect is caused by β -carotene, which is not converted to vitamin A in the body.² Also, the intake of the nutrient helps reduce mortality among undernourished infants and young children.³ It has been found that mango (Alfonso var.) has an average concentration of 192.1 $\mu\text{g/g}$ of provitamin A carotenoids, 60% to 80% of which is β -carotene.² Because of the importance of this nutrient, several other studies have been made on the subject.^{4,6} Because of the importance of β -carotene and its high concentration in mango, a study on the stability of the nutrient was made with processed nectar obtained from locally harvested mangoes. Varieties Edward, Palmer, Irwin and Keitt were harvested mature green from an experimental orchard at the Fortuna substation of the Agricultural Experiment Station on the southern coast of Puerto Rico. The process for making the mango nectars was the same as described by Hernández et al.⁶

The nectars were stored at room temperature for one year. Samples of the unprocessed fresh pulp were analyzed for β -carotene content before the nectar processing. Afterwards, the four nectars were analyzed every other month for β -carotene content.

The method used for the assay was essentially the AOAC's⁷ with the following modifications:

1. The sugars of the sample were washed off with water and centrifuged.
2. Ethyl alcohol (95%) was used instead of acetone for the extraction.
3. The 9 ml of acetone was not used in the first dilution to 100 ml.
4. The column dimensions were 9 cm in length \times 1 cm in diameter.
5. The final volume was 25 ml.

The determinations were made spectrophotometrically with a Beckman DB-G Spectrophotometer (Beckman Instruments, Inc., Fullerton, CA)⁸ at 450 nm. A solution of 9:1 hexane (Fisher Scientific Co., Fair Lawn, New Jersey)/acetone (Mallinckrodt,

¹Manuscript submitted to Editorial Board 28 July 1991.

²Philip, T. and T. S. Chen, 1988. Development of a method for the quantitative estimation of provitamin A carotenoids in some fruits. *J. Food Sci.* 53(6): 1703-706.

³Rahmathullah, L., B. A. Underwood, R. D. Thulasira, R. C. Milton, K. Ramaswamy, R. Rahmathullah, and G. Babu, 1990. Reduced mortality among children in southern India receiving a small weekly dose of vitamin A. *New England J. Med.* 323 (14): 929-35.

⁴Bushway, R. J. and A. M. Wilson, 1982. Determination of α - and β -carotene in fruit and vegetable by high performance liquid chromatography. *Canadian Inst. Food Sci. and Technol. J.* 15(3): 165-69.

⁵Pozo, R. G., E. S. Saitua, I. Uncila, and J. A. Montoya, 1990. Simultaneous determination by HPLC of fat-soluble vitamins in albacore (*Thunnus alalunga*). *J. Food Sci.* 55(1): 77-8.

⁶Hernández, E. R. and J. R. Benero, 1982. Evaluation of four mango cultivars for nectar. *J. Agric. Univ. P. R.* 66 (3): 153-58.

⁷Official Methods of Analysis of the Association of Official Analytical Chemists, 14th ed., Washington, D. C., 1984.

⁸Trade names in this publication are used only to provide specific information. Mention of a trade name does not constitute a warranty of equipment or materials by the Agricultural Experiment Station of the University of Puerto Rico, nor is this mention a statement of preference over other equipment or materials.

Inc., Paris, Kentucky) was used as a blank. Although the AOAC recommended the wavelength of 436 nm for the readings, the maximum absorption of a 100% pure β -carotene solution in 9:1 hexane/acetone was 450 nm under scanning.

Table 1 shows that an average of 70% to 80% of the initial β -carotene concentration is lost during the mango nectar processing for all four varieties studied. Figure 1 shows that the β -carotene is highly stable under normal nectar storage conditions for a one-year period.

Even though much of the β -carotene of the mango pulp is lost during nectar processing, the nectar is still a good source of the nutrient. The nectar requires no special storage conditions, and its nutrient concentration remains constant throughout its entire shelf life.

TABLE 1.— β -Carotene in mango fresh pulp and mango nectar.

Variety	Fresh pulp	Nectar	% Lost
Edward	5360	1638	69
Irwin	6027	1128	81
Keitt	6471	1235	81
Palmer	5792	1870	68

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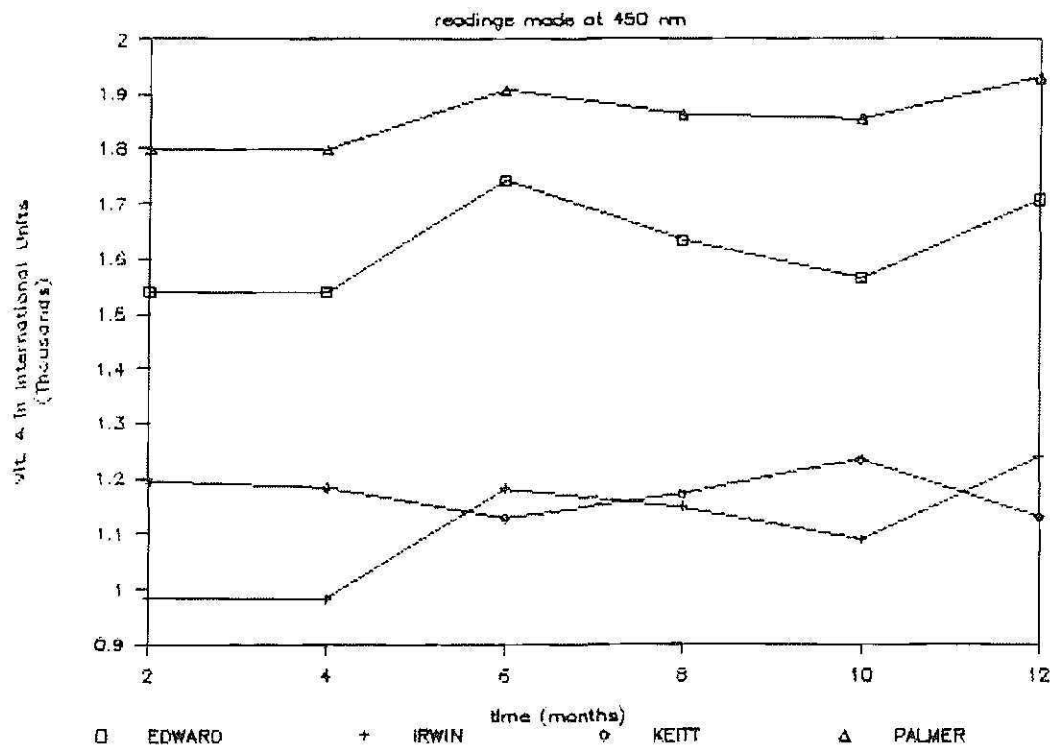


FIG. 1.—Beta-carotene stability in mango nectar.