Deutscher Tropentag, October 11-13, 2005, Hohenheim

"The Global Food & Product Chain—
Dynamics, Innovations, Conflicts, Strategies"

Evaluation of Mango Processing into Fluid Products for Improved Provitamin A Supply

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Abstract

Apart from the appropriate process technology, the production of high-quality food equally depends on the selection of the proper raw material. This experience can be particularly exemplified by mango (*Mangifera indica* L.) processing. In this contribution, the influence of proper raw material selection and thermal processing steps involved in small-scale batch and continuous industrial manufacture of fluid mango products on resulting provitamin A values is discussed. The provitamin A value of mango fruits and products is determined by their contents of β-carotene stereoisomers differently contributing to vitamin A biosynthesis.

Concerning the selection of suitable mango cultivars at appropriate processing ripeness, accumulation of β-carotene during postharvest ripening of nine Thai mango cultivars was assessed. The vitamin A potential was evaluated at different ripening stages unequivocally defined by a ripening index. Subjected to the same postharvest ripening conditions, only those cultivars developing a bright yellow-orange mesocarp colouration resulted in high vitamin A values of 892–1573 retinol equivalents / 100 g mesocarp dry weight at their fully ripe stage. Exponential development of mesocarp colour and all-trans-β-carotene levels, respectively, with the ripening index was described for each cultivar, allowing the selection of fruits of high provitamin A values for processing by easily accessible quality parameters.

Modern industrial year-round mango juice production is mostly based on purée intermediates produced during peak harvest seasons. The fruit component in the final nectar usually implies several heating treatments in the form of steam peeling, thermal inactivation of endogenous enzymes prior to enzymatic pulp liquefaction, and pasteurisation of purée and nectar, respectively. However, heat application in continuous processes is restricted to periods below 1 min. In contrast, simple small-scale batch processes at the household level require only the final pasteurisation of the filled product but by heat application for an extended process time. The effects of such thermal treatments on β-carotene degradation and isomerisation were studied by mimicking the processes at laboratory scale and by verifying the observations by stepwise process control at pilot-plant scale. The importance of fluid mango products produced at different scales as provitamin A source was demonstrated. Necessary plant physiological and technological prerequisites were identified.

Keywords: Beta-carotene, food quality, *Mangifera indica*, postharvest ripening, process technology

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