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# Substitution of commercial citric acid with hill lemon juice powder

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## ABSTRACT

An effort was made to substitute the commercially available citric acid, most commonly used in the preparation of almost all processed products, with foam mat dried hill lemon juice powder, during the preparation of Apple Jam, Apple Jelly and Brahmi Syrup. The results of the Triangle Difference Test for brahmi syrup, apple jam and apple jelly prepared by using citric acid and lemon juice powder as different acid sources do not show any significant differences. Only 8/18, 3/16 and 5/16 panelists could identify the samples correctly in brahmi syrup, apple jam and apple jelly, respectively. Most of the panelists preferred the product made by using lemon juice powder due to better mouth feel. The sale price of lemon juice powder including 20 per cent profit margin was computed to be Rs 185.14 per kg. The sale price of brahmi drink, apple jam and apple jelly prepared by using citric acid comes out to be Rs. 29.04, 43.39 and 51.55 per kg while the corresponding sale prices of products prepared from lemon juice powder were Rs. 29.08, 43.58 and 51.82 per kg of the product, respectively. Thus, the costs of production of products prepared by using citric acid and lemon juice powder were highly comparable. The technology if tested on pilot scales may open new avenues for the industry in the manufacture of various commercial, products.

**Key words :** Lemon, Juice powder, Citric acid

Hill lemon (*Citrus pseudolimon* Tan.) also known as "Galgal" is well known among the indigenous commercial varieties of lemon and grown in plains and sub-mountainous regions of North-Western Himalayan ranges including Himachal Pradesh, Punjab and some parts of Uttaranchal. Hill lemon trees demand less and return more, as evident from the fact that it is prolific bearer and has very high productivity, despite minimum requirements for irrigation, fertilization and other inputs, easy and cheap growth habits and almost freeness from diseases and pest attack. The nutritional value of this fruit lies in its high contents of acidity, ascorbic acid, minerals, flavonoids and phenolics (Gopalan *et al.,* 1995; Swisher and Swisher, 1977). Lemon juice also possesses special dietetic and medicinal significance associated with its vitamins, minerals and phenolics and is used as a preventive medicine for cold, influenza and constipation and many other diseases and human ailments (Aman, 1980; Manica, 1988 and Rao, 1993). In spite of such high productivity, good nutritional and therapeutic value, the hill lemon fruits fetch a very low market price owing to its limited and seasonal utility.

Lemon juice can be successfully converted into juice powder by foam mat drying technique (Sharma *et al.*, 2002). The prepared powder from lemon juice is of very high acidity, besides having good nutritional, therapeutic and medicinal properties. The high acidity of lemon juice powders may substitute synthetic citric acid in the preparation of some of the commercial products. This would not only substitute the synthetic citric acid but the prepared products shall also be supplemented in nutritional and other therapeutic constituents. These investigations were, therefore, undertaken to evaluate lemon juice powder as a substitute to commercially available synthetic citric acid in the preparation of various commercial products such as Brahmi syrup, apple jam and apple jelly.

## MATERIALS AND METHODS

The present investigations were carried out in the Department of Post harvest Technology, Dr. Y.S. Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh, during 2001-2002. The juice from hill lemon (*Citrus pseudolimon* Tan.) fruits, harvested at optimum maturity from local orchards in district Sirmour (Himachal Pradesh), was extracted using rosing machine, strained through muslin cloth and heat pasteurized at $90^0$C for 10 seconds followed by quick cooling to room temperature and preservation with 500 ppm $SO_2$ (Ting and Rouseff, 1986). Juice was clarified by using "Pectinase CCM" enzyme @ 0.2 per cent for 2 hours at $50 \pm 2^0$C followed by filtration under suction and treated with an acidic cation exchange resin, Dowex-50W for the purpose of reduction of browning in the prepared concentrates (Sharma *et al.*, 2004). A $60^0$ Brix concentrate was prepared from treated juice in a rotary