Preparation and Acceptability of Banana Nectar[1]

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INTRODUCTION

Bananas are often grown on coffee farms in Puerto Rico, to provide shade for the coffee trees and as a secondary crop. The Montecristo banana is the type generally planted; a cultivar of the Cavendish subgroup of Eumusa.

Bananas are graded according to size and color of the fruit (2). A good portion of the fruit, although ripening well, does not meet the necessary size requirements to be sold fresh as first class produce. Fruits graded as second class may be used for processing, as the size of the fruit does not affect the quality of the end product.

Ripe bananas at present are processed and marketed mostly as a baby food dessert or as a puree to be used as a base for the preparation of other products.

The work reported herein was conducted for the purpose of developing a method for commercially preparing a good quality banana nectar, and to evaluate its consumer acceptability.

MATERIALS AND METHODS

Fully developed green fruit of the Montecristo cultivar, grown in the vicinity of Adjuntas, P.R., was used in these studies. The bananas were ripened following the method developed by Sánchez-Nieva et al. (7) to grade 6 as described by the Color Grade Chart of the Fruit Dispatch Co. (2).

Two different methods were studied (3,5), for the preparation of the banana pulp puree. After some preliminary work, a new method was designed to meet with our needs and fit our experimental plant facilities. Ripe bananas were hand-peeled, steam-blanched for 5 minutes at 20 psi, and then macerated in a screw press with a 0.045 screen. The pH was adjusted with citric acid to 4.00 and the pulp was then drawn off into a 3-section Votator closed system where it was heated to 200° F. It was then rapidly cooled to 45° F. using water and ammonia as coolers, packed in plastic containers, and frozen.

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To develop the most acceptable formulation for the nectar, different proportions were tried and evaluated by a tasting panel using Kramer's +2, −2 scale (4). Levels of 15-, 20-, and 25-percent pulp, at different pH values, were tried at 15° Brix soluble solids concentration. When the final formulation was selected, banana nectar was processed in a pilot plant scale and then tested for acceptability by about 5,000 tasters who evaluated the product. Shelf-life studies of these samples were also conducted. Periodically, samples of banana nectar were submitted to sensory evaluation and chemical analyses. Vitamin C content was analyzed following Ballantine's method (1). Total acidity, measured as percent citric acid, and reducing and total sugars were determined using the methods reported in the A.O.A.C. (6).

RESULTS AND DISCUSSION

In the preparation of banana pulp puree, different methods were tried in which natural or acidified pulp was processed, packed in tin cans, and frozen. Although the purees thus obtained were of good quality, a browning reaction of some sort took place which made them unappealing to the eye. This problem was solved by packing the puree, at pH 4.00, prepared as described under Materials and Methods, in plastic containers or in plastic-lined cans. The pulps were kept frozen until needed for the preparation of the nectar.

The first samples of banana nectar were prepared at 25-percent pulp content with the pH adjusted to 3.70. These specifications are approximately standard for similar products. These first samples were rated very low by a tasting panel because of their high acidity and viscosity.

New samples were then prepared at a 15-, 20-, and 25-percent pulp content keeping the pH level fixed at 4.00, which was precisely the pH value of the pulp itself. The 15- and 20-percent levels were rated acceptable by the tasting panel. All additional tests were conducted using the 15-percent concentration.

The level of acidity was studied next, by preparing nectars with pH values ranging from 3.7 to 5.0. Samples with pH values under 4.5 had a bright yellow color; those with a higher pH developed a grey discoloration. Sensory evaluation revealed no significant difference in flavor between the samples. The pH 4.00 level was selected finally as the most adequate for further use because it resulted in better color and more effective pasteurization

In the final processing of the nectar, coagulation of the pulp was observed when pasteurization took place at about 200° F. This condition was overcome by adding a cellulose gum stabilizer at the rate of 1 pound per 100 gallons of nectar, and by homogenizing it prior to pasteurization at 190°

to 200° F. The final product was then canned hot in tin or enameled containers, rapidly cooled, and stored at 85° F.

Periodical sensory, chemical, and microbiological evaluation tests showed that samples can keep in good condition for more than 6 months. It was observed, however that samples canned in tin containers preserved the color better. This nectar has a low vitamin C content of about 2 mg./100 ml. Enrichment to fulfill minimum daily requirements would be recommended.

A 1-week consumer acceptance test with the chilled nectar was conducted among the customers of a big local commercial center. About 5,000 persons of all ages rated the nectar using the 9 point hedonic scale. Of these, 76 percent liked it very much and 17 percent liked it moderately.

SUMMARY

A method was developed to prepare commercially banana nectar of good quality and high acceptability using banana pulp puree as a base. The pulp puree was prepared from hand-peeled ripe fruits processed at pH 4.00, packed in plastic containers and frozen. It was found that the best formulation for the nectar consisted of a 15-percent pulp content at pH 4.00. During the final processing, the addition of a cellulose gum stabilizer at the rate of 1 pound per 100 gallons of the nectar and the homogenization of the nectar prior to pasteurization at 190° to 200° F. prevented the separation of the pulp. The nectar thus prepared showed a shelf-life of more than 6 months when kept in tin cans at 85° F. A consumer acceptance test in which 5,000 tasters evaluated this product showed an acceptance of 93 percent (76 percent liking it very much and 17 percent moderately).

RESUMEN

Se desarrolló un método para preparar comercialmente un néctar de buena calidad y gran aceptación, usando como base un puré de pulpa de guineo. El puré de guineo se preparó de frutas maduras peladas a mano, a un valor pH de 4.00, se envasó en recipientes plásticos y luego se congeló. Se encontró que la proporción más conveniente para la preparación del néctar era de 15 por ciento de pulpa a un valor pH de 4.00. Para la elaboración final del néctar evitando la separación de la pulpa, se usó 1 libra de un estabilizador de celulosa por cada 100 galones de néctar y se homogenizó antes de pasteurizarlo a una temperatura de 190° a 200° F. El néctar se conservó en almacén por más de 6 meses a 85° F., envasado en latas estañadas.

En una prueba de catado que incluyó 5,000 personas, el néctar fué bien acogido por el 93 por ciento de los catadores (el 76 por ciento lo consideró muy bueno y el 17 por ciento bastante bueno).

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