A MECHANICAL METHOD FOR EXTRACTING TAMARIND PULP[1]

Tamarind (*Tamarindus indica*, L.) is a tropical fruit, the pulp of which is used in Puerto Rico as a base in the preparations of syrups, drinks and sherbets. Although chemical composition and utilization of tamarind pulp has been discussed widely in the literature, no information is available concerning methods for extracting and preserving the pulp for industrial use. The usual method for pulping tamarind presently consists of breaking and removing pod shells by hand, then dispersing any pulp adhered to the seeds by mechanical agitation in water. Removal of pod shells by hand is both cumbersome and costly. Shelling by hand requires about 8 man-hours per hundredweight of shelled fruit.

An improved procedure for extracting and preserving tamarind pulp is outlined in this paper.

Tamarind is produced mainly in the Ponce and Salinas regions where it grows more or less wild. The fruit used in these studies, however, was purchased at the Río Piedras market, and apparently a mixture of different varieties of variable size and shape. The pods processed were selected from a moving belt upon which all those visibly spoiled, mold-infected or insect-damaged were discarded. The selected pods were washed with sprays of tap water in a rotary rod-reel washer, then passed through a shell-breaking grater operated at 243 r.p.m. with a baffle clearance of ⅛ inch. The broken pods were discharged into 50-gallon stainless steel tanks provided with agitators and water added. The mixture was agitated for 5 to 7 minutes until a uniform mash was formed. The mash was fed by gravity into a Langsenkamp EZ Adjust Pulper[2] equipped with a 0.045-inch screen and two nylon brushes operated at 948 r.p.m. to separate the pulp from seeds and shells. The pulp was then passed through a paddle finisher operating at 1,509 r.p.m., with ⅛-inch paddle clearance and a 0.020-inch screen. The finished pulp was pasteurized in a Votator-type pasteurizer at 185° F. (85° C.), filled into No. 10 tin cans, and sealed. The sealed cans were held upside-down to sterilize the lids, then water-cooled, air-dried, and stored at a room temperature of approximately 85° F. (29.4° C.).

Tamarind pulp cannot be separated from the fruit by mechanical means alone, thus dilution is necessary. Efforts to extract without water failed as a sticky thick mash was formed due to the low moisture content. Three fruit-

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[2] Trade names are used in this paper solely for the purpose of providing specific information. Mention of trades names does not constitute a guarantee or warranty of the equipment by the Agricultural Experiment Station of the University of Puerto Rico, or an endorsement by the Station over other equipment not mentioned.

water ratios were tested for determining proper dilution. A 1:1 dilution ratio produced a hardly flowing slurry which gave rise to frequent stoppage thus delaying the operation. Ratios of 1:1½ and 1:2 produce slurries which permit the pulping line to operate continuously. As a measure of the efficiency of the pulping operation, the extracted solids were calculated for the three dilution ratios tested. The 1:2 fruit to water ratio produced the highest soluble- and total-solids yields. Pulps obtained at this dilution were about 13.2° Brix with excellent fruit flavor.

Six lots of tamarind pulp were canned for the purpose of determining the possible effect of pod shells on the quality of extracted pulps. Three lots were extracted as described from unpeeled fruit using a 1:1½ fruit to water ratio. The other three were prepared with a 1:1 fruit to water ratio from hand-peeled fruit. Fruit drinks were prepared periodically from the stored pulps during the 360 days of the study. The drink formulation was standardized as follows: 1 part fruit pulp, 4 parts water and enough sugar to bring the soluble solid content to 22° Brix. The drinks were chilled prior to presentation for evaluation to a tasting panel (10 to 13 members). The panelists scored the product in accordance to a 9-point scale ranging from 1, "dislike extremely" to 9, "like extremely."

Drinks prepared throughout the year from pulps extracted from whole fruit scored in the range of 7.3, "like moderately," to 7.7, "like very much." Drinks prepared from pulps extracted from hand-peeled tamarinds scored in the range of 6.9 to 7.3, or as "like moderately."

The proportion by weight of pulp, seeds and shells in ripe tamarind fruit for processing was found to be: Pulp 30 percent, seeds 40 percent, and shells 30 percent. Chemical analyses of hand extracted pulp samples were: Reducing sugars[3] 40 percent, total acidity[4] (as tartaric acid) 23.8 percent, moisture[5] 28.2 percent, and soluble solids 69.9 percent.

The mechanical extraction method for unpeeled tamarind fruit described herein produces high quality tamarind pulps with prolonged shelf life at less cost with reduced labor.

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[3] Jacobs, M. B., The Chemical Analyses of Food and Food Products, 3rd. ed., D. Van Nostrand Company, Inc. Princeton, New Jersey, 1958.

[4] Ibid.

[5] Official Methods of Analyses of the Association of Official Agricultural Chemists, 10th ed, Washington, D.C., 1965.