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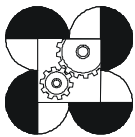
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Mango Leather Production



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‘Our Business is Industry...’

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Livelihood Technology Series 65
Mango Leather Production

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MANGO LEATHER PRODUCTION

Mango leathers, more commonly known as mango rolls are considered high-value products, that are within reach of the A, B and C markets. The processing may be simple, but the yield may not be ideal for a backyard operation. Five kilos of mangoes usually produce less than a kilo of mango leather.

Product Description

Mango leather, sometimes called mango roll or mango toffee, is prepared from the puree of table-ripe mangoes, dried to form glossy sheets and cut into desired sizes. The product is about 1 mm thick, deep orange in color with the characteristic mango flavor. The product is leathery but chewable. Its texture can be described as somewhat pliable but can still be torn into pieces.

Mango leather can be eaten as is, as a snack or dessert, or used as pie fillings and toppings for cakes. The product remains of good eating quality for years when stored in the freezer, for months under refrigeration, and for about 7 months at ambient conditions.

CHEMICAL COMPOSITION OF MANGO LEATHER

Moisture Content	15 – 17%
Titration acidity (TA)	1.37 – 3.0%
Total Soluble Solids (TSS)	80 – 82%
Ascorbic acid (Vitamin C)	16.5 mg %
Water activity (a_w)	0.56 – 0.64

RAW MATERIAL DESCRIPTION/SPECIFICATION

Table ripe mature mangoes with about 17-19% soluble solids are used in the processing of mango leather. Carabao variety is particularly preferred because of its high mango flavor retained in the final product if said variety is used. The fruit can be ripened if purchased unripe (following the procedure developed by the Food Development Center, NFA), or can be procured table-ripe from nearby markets. Prior to processing, the fruits are sorted and graded according to quality and ripeness.

PROCESSING PROCEDURE

Ingredients

- ripe mangoes (carabao variety)
- pure refined white sugar (optional)

Utensils

- stainless steel knife
- stainless steel/plastic mixing bowls
- stainless steel basting spoon
- blender
- double boiler
- casserole
- stove
- thermometer

Packaging Material

- OPP/Met foil/PE plastic bags (laminates)
- PE bags (0.003mm thickness)

Procedure

1. Select mature table ripe mangoes, preferably the carabao variety.
2. Sort and grade to ensure uniformity of size.
3. Weigh.
4. Wash in clean tap water to remove surface dirt.
5. Soak in 150 to 200 ppm chlorinated water for 10 minutes to reduce microbial load.
6. Drain. Slice mango along its lateral axis from both sides of the middle seed section. Scoop out mango flesh. Peel seeds. Scrape the edible pulp avoiding the fibrous portion.
7. Blend thoroughly to obtain a homogenous mixture.

8. Check TSS. Adjust the soluble solids content of the puree to 20°Brix* using pure refined white sugar. (Optional)
9. Pasteurize the mango puree (80° to 82°C for 15 minutes) using double boiler.
10. Spread puree evenly on stainless steel trays.
12. Dry in a cabinet dryer at 60 ± 5°C for 10-14 hours. Drying may be done in a solar dryer as long as drying area is clean and free from dust and flies, rodents and other insects.

**please see Annex A*

ANNEX A

HOW TO PREPARE

I. Calcium Hypochlorite Stock Solution (CHLORINATED WATER)

- A. C_1 = Percentage available chlorine in hypochlorite granules: 70%
 C_2 = Concentration of desired solution: 10,000 ppm stock solution
 V_2 = Volume of desired solution: 1 gallon (3.78 liters)

Calculation:

$$C_1 V_1 = C_2 V_2$$

where:

- V_1 = volume of desired concentration
 V_2 = required amount needed for final concentration
 C_1 = percentage available in solution/granules
 C_2 = concentration of desired solution

$$C_1 = \frac{C_2 V_2}{V_1}$$

$$V_1 = \frac{C_2 V_2}{C_1}$$

$$C_2 = \frac{C_1 V_1}{V_2}$$

$$V_2 = \frac{C_1 V_1}{C_2}$$

Problem:

Prepare one gallon stock solution with 10,000 ppm concentration using calcium hypochlorite (CaOCl_2) granules with 70% available chlorine.

Required:

Amount of calcium hypochlorite granules needed to prepare 10,000 ppm concentration of stock solution.

Solution:

Volume of stock solution = 1 gal (3.78L; density_{water} = 1 kg/L; therefore 3.78 kg)

Weight of stock solution = 3.78 kg

$$C_1 = \frac{C_2 V_2}{V_1}$$

$$C_1 = \frac{(3.78 \text{ kg})(1\%)}{70\%} = \mathbf{0.054 \text{ kg or } 54 \text{ g}}$$

Preparation:

Dissolve 54 g calcium hypochlorite granules in 1 gallon water. Mix.

- B. Prepare a gallon chlorinated water with concentration of 30 ppm needed to sanitize food handlers hand. How much stock solution with concentration of 10,000 ppm is required to make the desired chlorinated water for sanitizing food handler's hand?

Given:

- Let V_2 = Volume of desired chlorinated water = 3.78 L
 C_2 = Concentration of desired chlorinated water = 30 ppm
 C_1 = Concentration of stock solution = 10,000 ppm

Required:

$V_1 =$ Volume of stock solution needed to prepare a gallon of chlorinated water with concentration of 30 ppm

Solution:

$$V_1 C_1 = V_2 C_2$$

Preparation:

Add 11.34 mL of stock solution from A to 1 gallon water. Mix.

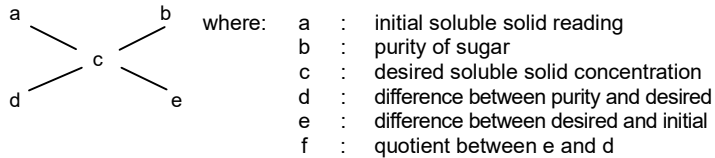
To 11.34 mL of stock solution from A, add enough water to make 1 gallon. Mix thoroughly.

C. Prepare a gallon of chlorinated water with concentration of 200 ppm.

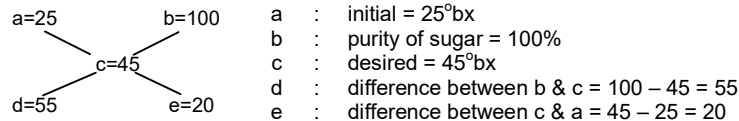
COMPUTATION - SAME AS B.

Amount of sugar using the Pearson's Square Method

II.



Calculate the amount of sugar required to adjust the 3 kg of mango puree with an initial concentration of 25°Bx to a final concentration of 45°Bx.



To compute:

$$f = \frac{e}{d} = \frac{20}{55} = 0.364$$

Requirement: Amount of sugar needed to adjust 3 kg mango puree to 45°Bx.

0.364 x 3 kilos = 10.91 grams or 1.091 kg sugar

You will need to add 1.091 kg or 10.90.91 grams sugar to 3 kg of mango puree to have a final concentration of 45°Bx.