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Development of fruit leather fortified with Calcium

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Abstract

Fruit leather was developed by Tomato puree fortified with Calcium. The leathers were standardized using (99.5:0.5) puree & Calcium carbonate powder, sugar (30 %) & Citric acid (0.3 %). Three treatments were used in the ratio (99.5:0.5, 99:1, 98.5:1.5) for making leather, indicated by T₁, T₂ and T₃ respectively. The product was analysed for sensory attribute like (colour, appearance, flavour, taste, body, texture & overall acceptability) by trained panellist using 9- point hedonic scale, the physicochemical attributes like (Moisture, Total Solids, Acidity, Fat, Protein, Ash, & Calcium) & microbiological attributes like (TPC, Coliform, Yeast & Mould count). The treatment T₁ (99.5:0.5) was found best product and highly acceptable.

Keywords: Tomato, Calcium carbonate, Sugar & Citric acid.

1. Introduction

Fruit leather or bar means the product prepared by blending pulp/puree from sound ripe fruit, fresh or previously preserved nutritive sweeteners, butter or other vegetable fat or milk solids & other ingredients appropriate to the product & dehydrated to form sheet which can be desired shape or size.

The product shall comply with the following standers ^[1]

(i) Moisture (m/m)	not more than 20 %
(ii) Total Soluble Solids (m/m)	not less than 75 %
(iii) Fruit Content (m/m)	not less than 25 %
(iv) Calcium Carbonate (m/m)	not more than 2 %
(v) Total Plate Count (TPC)	not more than 40,000 count / gm
(vi) Yeast & Mould Count	not more than 100 count / gm

Fruit leather, also called a fruit bar or a fruit slab, is a dehydrated fruit-based confectionery dietary product which is often eaten as snack or dessert. Consuming fruit leather is an economic & convenient value-added substitution of natural fruit as a source of various nutritional elements. Furthermore, fruit leather has far fewer calories, less than 100 Kcal per serving, and then many other snacks. Fruit leathers are restructured fruit made from fresh fruit pulp or a mixture of fruit juice concentrates & other ingredients after a complex operation that involves a dehydration step. Fruit pulp-based fruit leathers are nutritious & organoleptically acceptable to customers. They contain substantial quantities of dietary fibers, carbohydrates, minerals, vitamins & antioxidants ^[2].

Fruit leather is one product that can be made using a drying process. Fruit leathers are dried sheets of fruit pulp that have a soft, rubbery texture & a sweet taste. Fruit leathers can be dried using various drying forces including sun drying, oven drying, cabinet drying & dehydrator drying. The edible portion of fruit (one or more types) is pureed, mixed with other ingredients to improve its physico-chemical & sensory characteristics ^[3].

The composition of final fruit product may vary depending on the processing conditions. Sun drying has traditionally being the process employed for preparing fruit leather from ripe fruit. However, sun dried products can become discoloured & the process can be unhygienic & lengthy ^[4].

The preservation of fruit leather depends on their low moisture content (15-20%), the natural acidity of the fruit & high sugar content. Major quality parameters associated with dried fruit products, in no particular order, are change of colour / visual appeal, flavour, shape, texture, shelf-life, microbial load, retention of nutrient, porosity or bulk density, rehydration properties, water activity and chemical stability ^[5].

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2. Material & Methods

2.1. Procurement and purchasing of the raw materials:

2.1.1. Tomato - Tomato (*Lycopersicon esculentum* Mill.) was purchased from the local market of Allahabad city.

2.1.2. Sugar - Sugar was purchased from the local shop of Allahabad city.

2.1.3. Citric Acid - Citric acid was purchased from Thermo Fisher Scientific India Pvt. Ltd.

2.1.4. Calcium Carbonate - Calcium Carbonate was purchased from Thermo Fisher Scientific India Pvt. Ltd.

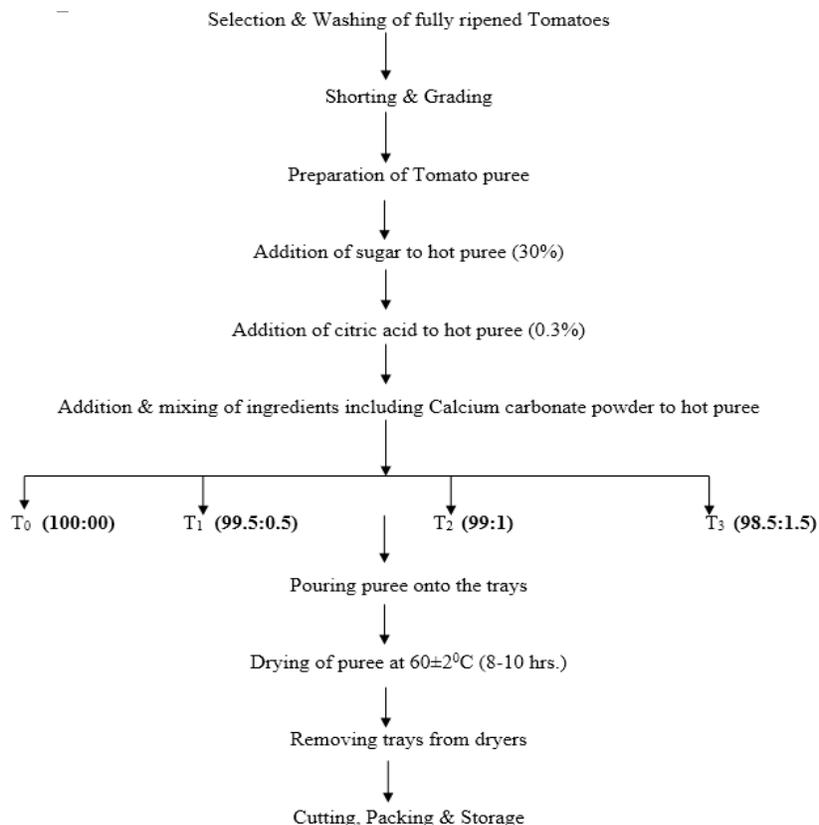


Fig 3.4.1: Schematic diagram of the preparing process of tomato leather.

3. Results & Discussion

Table 5.1: Mean value, F-test, S.Ed. & C.D. value of all parameters.

Parameters	Scores / Values based on mean values of different parameters of treatment				F-Test	S.Ed.	C.D.
1. Sensory score (9- point Hedonic Score)							
	T ₀	T ₁	T ₂	T ₃			
(a) Colour & Appearance	7.8	6.74	6.49	6.43	NS	0.427	
(b) Flavour & Taste	7.31	6.35	6.34	6.31	NS	0.483	
(c) Body & Texture	7.2	5.94	5.86	5.75	*	0.301	0.737
(d) Overall acceptability	7.43	6.34	6.30	6.16	*	0.309	0.755
2. Physio-chemical analysis (%)							
(a) Total Solids	81.42	82.55	83.83	85.33	*	0.617	1.509
(b) Total Moisture	18.58	17.45	16.17	14.67	*	0.617	1.509
(c) Total Protein	2.50	2.46	2.41	2.38	*	0.017	0.042
(d) Titratable Acidity	1.28	1.18	1.16	1.12	*	0.017	0.042
(e) Total Ash	1.18	1.53	1.62	1.72	*	0.124	0.304
(f) Crude Fat	0.35	0.32	0.29	0.27	*	0.016	0.039
(g) Total Calcium	0.14	0.64	0.81	0.92	*	0.008	0.020

* = Significant, NS = Non-Significant

4. Conclusion

The tomato fruit leathers developed were generally judged to be acceptable by the sensory panellists. Fruit leathers preparation was a relatively new concept for preserving fruit that can be easily implemented & its advantage is that it may utilise fruit not suitable for canning, freezing or other storage methods. Tomatoes can be preserved by the production of

tomato fruit leather without addition of any artificial/chemical preservatives. The addition of citric acid, calcium carbonate added in this research was very small & so this can be considered as natural products. Manufacturing of fruit leather required simple processing technology. However, the product needed further improvement for market acceptability. In view of experimental results obtained during the present

investigation, it may be concluded that the samples of treatment T₁ was found to be the best in every aspect of sensory quality i.e., colour & appearance, flavour & taste, body & texture and overall acceptability.

Therefore, it may be concluded that, there is a great scope of manufacturing fruit lather using tomato pulp fortified with calcium carbonate as it is proved to have nutritional properties as well as health benefits and it is good for old age group people.

5. References

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