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## Physico-Chemical and sensory qualities in kulfi prepared by fruit pomace and bura (Khandsari)

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#### Abstract

The present investigation was made with an attempt to develop a fruit pomace kulfi by partial addition with different level of pineapple pomace, orange pomace and pomegranate pomace, The kulfi samples of different treatments and control Physico-chemical analysis fat percentage, total solids, acidity, protein, moisture, ash, melting resistance was done for estimating its nutritional content and safety and Organoleptic characteristics like (flavour and taste, body and texture, colour and appearance) by trained panel list using 9 point hedonic scale. Average value of sensory characteristic of 4% combination of orange pomace incorporated in kulfi was found higher than all treatment combination. Thus as for as product acceptability judged by Organoleptic evaluation and therapeutic value is concern, the treatment can be rated as  $T_6 > T_5 > T_1, T_3, T_4, > T_0, T_3, T_8, > T_7, T_9$ .

**Keywords:** Pineapple, orange, pomegranate, pomace and kulfi

#### Introduction

Kulfi also known as Malai Kulfi/ Malai-ka-burf is an indigenous frozen dairy product, which closely resembles ice cream in composition. In recent years, the consumption of ice cream in India has increased considerably in big cities and towns. After a long time it was realized that there is a need to develop the indigenous product, as they have ready market in India Aneja *et.al.*, 2002 [3]. Simple stated, overall goal of designing the ice cream is to incorporate several different insoluble's (air bubbles, ice crystals and fat globules) into an aqueous phase in the smallest sizes and in the greatest number possible Sharma and Hissaria 2009 [9]. Kulfi has nutritional significance but possess no therapeutic properties. The growing interest of consumers towards therapeutic products Hoji 1982 [7]. Fruit pomace is a rich source of carbohydrates, dietary fibbers, minerals, vitamin C and also has high moisture content Extruded snack products are predominantly made from cereal flour or starches and tend to be low in protein with low biological value. The crude fibre content of fruit pomace is approximately 14-30% of the dry weights. Sugarcane bura is traditional Indian sweetener which is produced in addition to sugar from sugarcane. These sweeteners are the natural mixer of sugar and molasses. The present investigation on qualitative of selected fruit pomace and bura with the following objectives: To optimize the process of manufacturing Herbal Kulfi, assess the Physico-chemical and Organoleptic, of the new formulation Kulfi.

#### Materials and methods

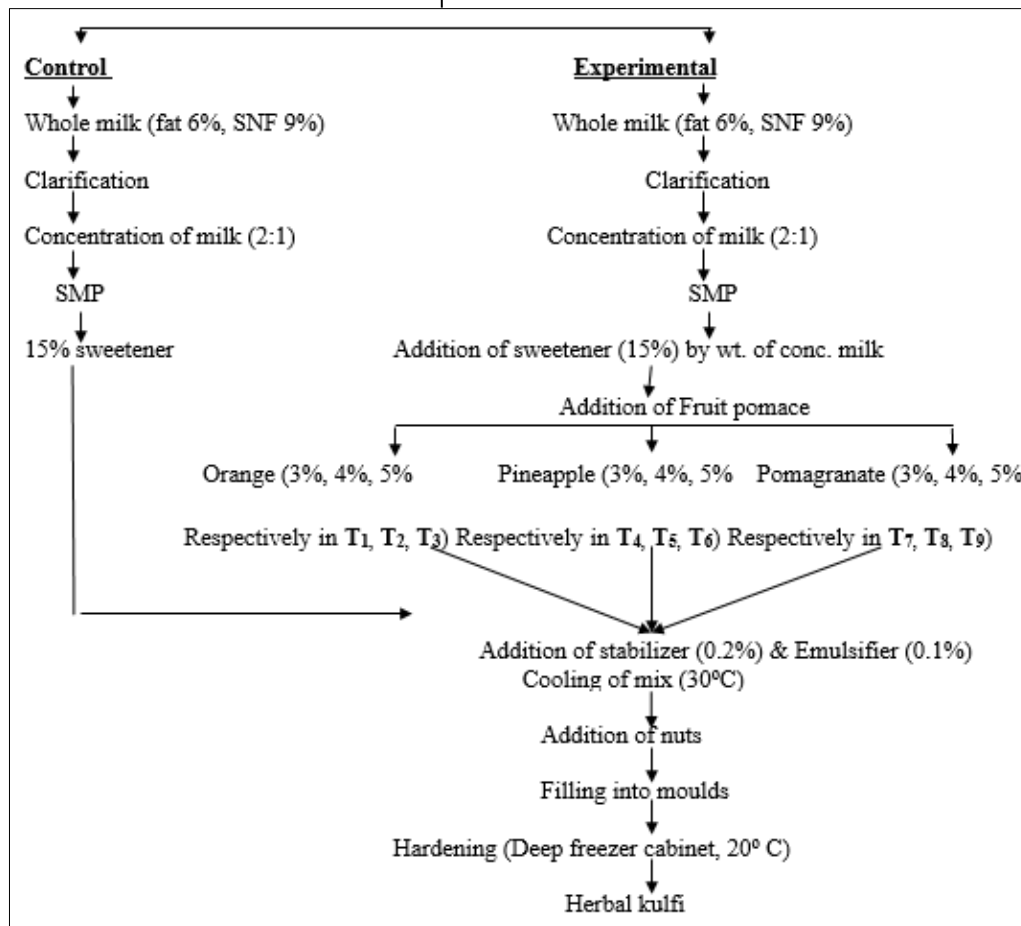
This experiment was carried out in the Lab of Student Training Dairy Warner school of Food and Dairy Technology, Sam Higginbottom Institute of Agriculture, Technology & Science, Deemed to be University, Allahabad (U.P.).

Skimmed milk powder Brand Anik spray, Sugar, Stabilizer, Emulsifier and Nuts were obtained from the local market of Allahabad. Bura and fruit was procured from local area of Allahabad.

#### Treatment

$T_0$  control sample of Kulfi mix was standardized to 10% fat, total solids 42.5%, sweetener 15%, 0.3 % of stabilizer and emulsifiers. Experimental sample of Kulfi mix was standardized to 10% fat, total solids 42.5%, sweetener 15%, 0.3 % of stabilizer and emulsifiers. Fruit pomace the rate of addition Orange 3%, 4%, 5% respectively in  $T_1, T_2, T_3$ , Pine Apple 3%, 4%, 5% respectively in  $T_4, T_5, T_6$  and pomegranate 3%, 4%, 5% respectively in  $T_7, T_8, T_9$ . Skim milk powder was added as a source of MSNF as required so that the formulation contains 42.5 % total solids.

## Flow chart for manufacturing Herbal Kulfi



Source: Sukumar (1980) <sup>[14]</sup>

### Physico-Chemical Analysis

**Fat percent in frozen dessert** - The fat percent in Kulfi was determined as per I.S. 2802 (1964) <sup>[11]</sup>.

**Determination of total solids** - Total solids in plain Kulfi and probiotic Kulfi was determined gravimetrically as per the procedure laid down in dairy chemistry manual, ICAR Publication and in IS:1479, Part: II, 1961(20)

**Determination of moisture**-The moisture percentage in Kulfi was determined as per procedure laid down in IS.1165 (1957) <sup>[8]</sup>.

**Moisture percentage in skim milk powder**-The moisture percent in skim milk powder will determined as per I.S.1165 (1957) <sup>[8]</sup>.

**Percentage of Acidity**-Titratable acidity of samples (expressed as lactic acid) was determined as per the procedure laid down in IS: 1479, Part: I. (1960)

**Organoleptic evolution** - The Kulfi samples of different treatments was analyzed for organoleptic Quality (flavour, body, texture, colour, appearance and melting resistance).

Attributes was rated on nine point Hedonic scale (Nelson and Trout, 1964)

### Results and discussions

Chemical analysis (Moisture, Fat, Total Solids, Acidity, Protein, ash, pH) was done for estimating its nutritional contents of kulfi sample. Organoleptic characteristic like (Malting, Viscosity, Hardness, Colour, Taste, Flavour, Texture and Appearance) was evaluated by sensory methods using in 9 point hedonic scale. Showed the average values of Physico-chemical and organoleptic given in Table 1.

### Effect of different combination of fruit pomace on Physico-chemical and sensory properties of Kulfi.

The present study was done by incorporated different combination of pineapple pomace, orange pomace and pomegranate pomace viz. 3%, 4% and 5% respectively in kulfi. The kulfi of best sample i.e. combination of 4% orange pomace accorded to sensory evaluation. Analyzed the data of Moisture, Fat, Total Solids, Acidity, Protein, ash, pH were found significant ( $p < 0.05$ ). The data of samples of kulfi were found five present combination of pomace higher than 3% and 4% combination of pomace. The compositional attributes of all samples are well above maximum and minimum values specified for kulfi 'FSSAI, 2011.

**Table 1:** The average value of physico-chemical and organoleptic of fruit pomace kulfi

Parameters	Chemical and Organoleptic average values of Samples										CD Value
	Control	Pineapple Pomace			Orange Pomace			Pomegranate pomace			
		3%	4%	5%	3%	4%	5%	3%	4%	5%	
Moisture	57.52	57.40	57.70	57.60	57.50	57.44	57.81	57.33	57.51	57.75	0.1690
Fat	10.006	10.086	10.27	10.53	10.22	10.24	10.92	10.04	10.25	10.756	0.010921
Protein	3.516	3.58	3.644	3.74	3.648	3.708	3.76	3.594	3.716	3.746	0.7342
Acidity	0.192	0.204	0.222	0.234	0.222	0.234	0.248	0.206	0.218	0.236	0.008106
T.S.	42.30	42.50	42.60	42.53	42.54	42.52	42.71	42.56	42.64	42.68	0.042178
Ash	0.51	0.572	0.61	0.726	0.616	0.628	0.738	0.614	0.624	0.732	0.012422
PH	6.428	6.152	6.156	6.214	6.16	6.158	6.182	6.168	6.176	6.212	0.024015
Melting	6.016	6.402	6.454	6.472	6.358	6.438	6.51	6.382	6.424	6.49	0.028252
Viscosity	25.65	26.26	27.24	26.89	28.78	29.27	29.78	29.54	27.66	28.25	0.028252
Hardness	9.856	8.658	8.55	7.858	8.256	7.454	7.36	8.692	8.166	7.562	0.028252
Colour	7.25	6.75	7.50	7.25	7.75	7.75	8.00	6.75	7.00	7.25	0.001254
Taste	7.50	7.75	7.75	7.5	7.75	8.00	8.25	7.25	7.5	7.25	0.001254
Flavour	6	6.75	7.00	7.00	7.15	8.00	7.75	7.75	7.75	7.25	0.001254
Texture	6.75	7.00	7.15	7.00	7.00	7.25	7.25	7.00	7.25	7.00	0.001254
Apperance	7.25	7.50	7.75	7.75	7.25	8.00	7.75	7.00	7.15	7.00	0.001254

The kulfi of best sample i.e. 5% Fruit pomace included kulfi was evaluated for various sensory qualities were also other levels of fruit pomace included kulfi. Parameters of sensory quality assessment were Malting, Viscosity, Hardness, Colour, Taste, Flavour, Texture and Appearance. The maximum score of overall acceptability was found in 5% fruit pomace included kulfi while minimum score was recorded of 0% powder included kulfi. Statistical analysis of Malting, Viscosity, Hardness, Colour, Taste, Flavour, Texture and Appearance both data was found significantly ( $p < 0.05$ ). Physico-chemical characteristic as Fat, Total Solids, Acidity, Protein, ash will be increased and moisture decrease if adding the any solid materials in milk products (Ali, *et al.*, 2016; Ayar and Gurlin, 2014) <sup>[1, 5]</sup>. It is made from dairy products such as cream combined with flavours and sweeteners such as sugar (Arbuckle, 1986) <sup>[4]</sup> Keeping in mind the above statement it was planned to preparation of fruit pomace kulfi. The experiment aims to formulate a nutritional improved with the following objectives. To evaluate the Physico-chemical and Organoleptic characteristic of formulated kulfi.

### Conclusion

It is concluded from present investigation samples prepared in the laboratory were superior in all respect of sensory and chemical attributes. A good quality kulfi could be made using the milk of good quality buffalo milk, adding khandsari, stabilizer in proper ratio fruit pomace. Best sample was found 4% incorporate orange pomace according to sensory evaluation which prepared by pineapple pomace, orange pomace and pomegranate pomace viz. 3%, 4% and 5% respectively. It is thus anticipated that fruit pomace kulfi will in future provide additional benefits to consumers with respect to convenience, price and health.

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