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Sensory evaluation of milk shake prepared by incorporation of date (*Phoenix dactylifera* L.) and jaggery

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Abstract
The present investigation was made with an attempt to develop a good quality milk shake by incorporating date and jaggery at different levels. The levels of date pulp were 5, 10, 15 percent and jaggery at the rate 4, 5, 6 per cent of milk. The data collected on different aspect were tabulated and analysed statistically with the methods of analysis of various and critical difference. Milk shake was made from buffalo milk having 6.10 per cent fat and per cent SNF. Physico–chemical analysis was carried out to ascertain the extent of variation in total solids, fat, protein and ash content. An organoleptic evaluation (colour and appearance, consistency, flavour and overall acceptability) was done by nine-point hedonic scale. According to analysis treatment J_1D_2 was found to be the best among the treatments i.e.4 percent jaggery and 10 per cent date pulp. Thus, as per product acceptability judged by organoleptic evaluation and therapeutic value is concerned the treatments can be rated on J_1D_2 (7.740), J_1D_3 (7.660), J_2D_2 (7.476), J_2D_3 (7.432), J_3D_2 (7.414), J_1D_1 (7.376), J_3D_3 (7.296), J_2D_1 (7.242), J_3D_1 (7.232).

Keywords: milk shake, date pulp, jaggery, organoleptic evaluation

Introduction
Milk shake, a product of Western origin, is obtained by freezing a mix very similar to soft serve ice cream mix and speed mixing the frozen product in a mixture to make it pourable and generate foam in it. It has lower fat and sugar contents and higher milk SNF content than icecream. The milk shake is generally served with some flavour blends. It can be made more delicious and nutritious with addition of fruits.

Similar to milk, honey and grapes, date (*Phoenix dactylifera* L.) are considered, a good source of nutrients like carbohydrates, protein, calcium, phosphorus, iron, vitamins like carotene, thiamine, vitamin 'C' and riboflavin and also other minerals. With plenty of vitamins and minerals, date have 25 per cent more potassium than bananas while being free from fats, sodium and cholesterol date plays an important source of energy and food in date producing areas.

Date are rich in sugar and are eaten fresh or dried. They form an important item of food in Arabian countries. Date are widely used in bakery and confectionery. They are made into jams and preserves or added in cakes and in dishes with milk, butter, meat, etc.

Jaggery is predominantly made in India, Pakistan, Bangladesh, Sri Lanka and Myanmar. Besides typical taste and aroma, it has many health benefits. It activates the digestive enzymes in the body, stimulates bowl movements and thus helps to prevent and relieve constipation. Jaggery helps in cleansing the liver by washing out harmful toxins from the body. One of the most well-known benefit of jaggery is its ability to purify the blood. When consumed on a regular basis and in limited quantities, it cleanses the blood. It is loaded with antioxidants and minerals such as zinc and selenium, which in turn helps to prevent free-radical.

Jaggery, due to its richness in many essential nutrients, is an effective natural treatment for menstrual problems, especially providing relief from cramps. It Prevents anaemia, boosts intestinal health due to its high magnesium content. With every 10 gram of jaggery, you get 16 mg of magnesium, which is 4 per cent of the daily requirement of this mineral. It prevents respiratory problems, helps to weight loss. Jaggery contains up to 4 kcal/gram energy.

Considering the nutritional importance of date and jaggery the present study was undertaken to standardize the manufacturing technology of milk shake by incorporation of date and jaggery and to evaluate the product for its acceptability.

Material and Methods

For preparation of milk shake, fresh buffalo milk was procured from Dairy farm, College of Agriculture, Dapoli, whereas ingredients like jaggery (Patanjali shop), dates (black) and stabilizer (Gelatine) were purchased from the local market.

The milk shake was prepared as per the procedure give by Sharma and Gupta (1978) [3] with slight modifications. Some preliminary trials were conducted to determine the range and appropriate stage of date pulp and jaggery for incorporation in milk shake. Three levels of date pulp (5, 10 and 15 %) and three levels of jaggery (4, 5 and 6 per cent) were selected on the basis of preliminary trials for further studies in five replications.

The sensory evaluation of product was carried out by using nine-point hedonic scale as per IS: 6273 (part-II), 1971. The product was evaluated organoleptically by the panel of an average ten semi – trained judges for its acceptability. The data were statistically analyzed according to Snedecor and Cochran (1994) [4] using factorial randomized block design.

Flow Diagram

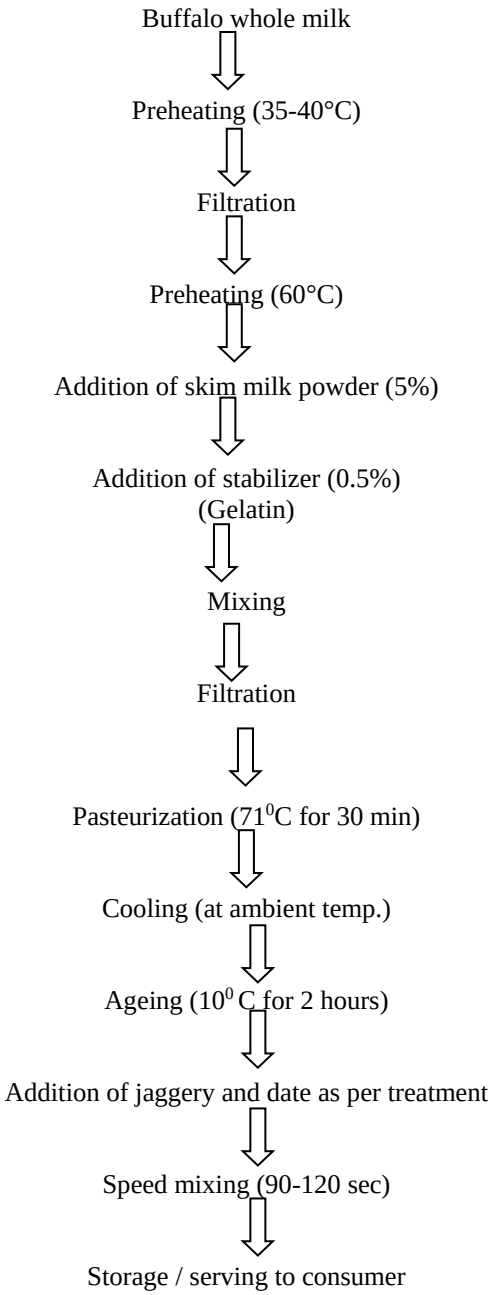

Fig 1: Flow diagram for preparation of milk shake

Results and Discussion

Colour and appearance

The statistical analysis of data reveled that there was significant variation due to different treatments in respect of colour and appearance of the product. Addition of jaggery significantly improved the colour and appearance of milk shake. The lowest score of 7.290 was recorded at addition of 6 per cent jaggery, which was significantly increased with decrease in level of jaggery. The highest score was obtained at 4 per cent jaggery (7.579). The increase in score may be due to the natural appealing yellowish colour of jaggery. However, at high level of jaggery (6 per cent) the score recorded for colour and appearance was significantly lower, which may be due to deep intense colour of jaggery which was less preferred by the judges.

There was no significant change in the score for colour and appearance due to addition of date pulp. The statistics analysis of the data further revealed the non-significant difference due to treatment combination (jaggery × date pulp interaction). This indicate that the variation in score for colour and appearance of milk shake due to different levels of jaggery was not greatly influenced by inclusion of date pulp.

Flavour: Variation in the score for flavour due to different treatments was found to be significant. The data regarding average score for jaggery and date pulp was 7.408 indicating that the flavour of all the samples was good irrespective of treatments. The milk shake with 5 per cent date pulp scored 7.254. The score further increased to 7.612 at 10 per cent addition of date pulp which then decreased with addition of date pulp i.e 7.510 at 15 per cent addition of date pulp. The highest score at 10 per cent level of date pulp may be due to typical clean flavour of date fruit and further addition of date pulp decreased the score decrease due to deep flavour of date which was not liked by judges.

The flavour recorded at 4 per cent jaggery was 7.565 which was higher than that of at 5 and 6 per cent levels of jaggery was decreased with the score of 7.408 and 7.402 which may be due to deep sweetness to the product which was denied by judges. The product with highest score 7.565 at 4 per cent level of jaggery was liked most by the judges due to its normal moderate sweetness.

Consistency: The milk shake possessed lowest score at 5 per cent level of date pulp having comparatively thin consistency (7.228). Increase in the level of date pulp to 10 per cent date pulp improved the consistency (7.451). Further, increase in the level of date pulp to 15 per cent, however produced the product with desirable consistency (7.495) as compared to the milk shake with 5 and 10 per cent level of date pulp. Further, it is stated that the product with 15 and 10 per cent level of date pulp are equally good in respect of consistency. It was observed that increase in the level of jaggery, improved the consistency with the score of 7.332, 7.375, and 7.467 at 4, 5 and 6 per cent level of jaggery, respectively.

Overall acceptability: From the overall acceptability scores as showed in Table 1, it is seen that highest overall acceptability score was recorded for milk shake with 10 per cent date pulp (7.543) and 4 per cent jaggery (7.592). The critical examination of the data indicates that from all the levels of date pulp, the best product was obtained by using 4 per cent level of jaggery. Hence, 4 per cent was considered as the most suitable level of jaggery for milk shake preparation. At this level of jaggery, date pulp at the level of 10 per cent produced the best quality product with the score of 7.740. Thus, for the production of most acceptable quality milk shake, a suitable level of date pulp was 10 per cent and that of jaggery with 4 per cent.

Table 1: Sensory quality of milk shake (out of 'nine')

Treatments	Colour and appearance	Consistency	Flavour	Overall acceptability
J_1D_1	7.436	7.200	7.210	7.376
J_1D_2	7.744	7.342	7.758	7.740
J_1D_3	7.558	7.454	7.728	7.660
J_2D_1	7.218	7.300	7.284	7.242
J_2D_2	7.598	7.434	7.544	7.476
J_2D_3	7.314	7.392	7.398	7.432
J_3D_1	7.438	7.184	7.268	7.232
J_3D_2	7.182	7.578	7.536	7.414
J_3D_3	7.250	7.640	7.404	7.296
SE ± Date	0.107137	0.072685	0.100672	0.091887
SE ± Jaggery	0.107137	0.072685	0.100672	0.091887
SE± Interaction	0.185567	0.125894	0.174369	0.159153
CD at 1 % (Date)	0.31292	0.2123	0.29404	0.26838
CD at 1 % (Jaggery)	0.31292	0.2123	0.29404	0.26838
CD Interaction	0.542	0.36771	0.5093	0.46485

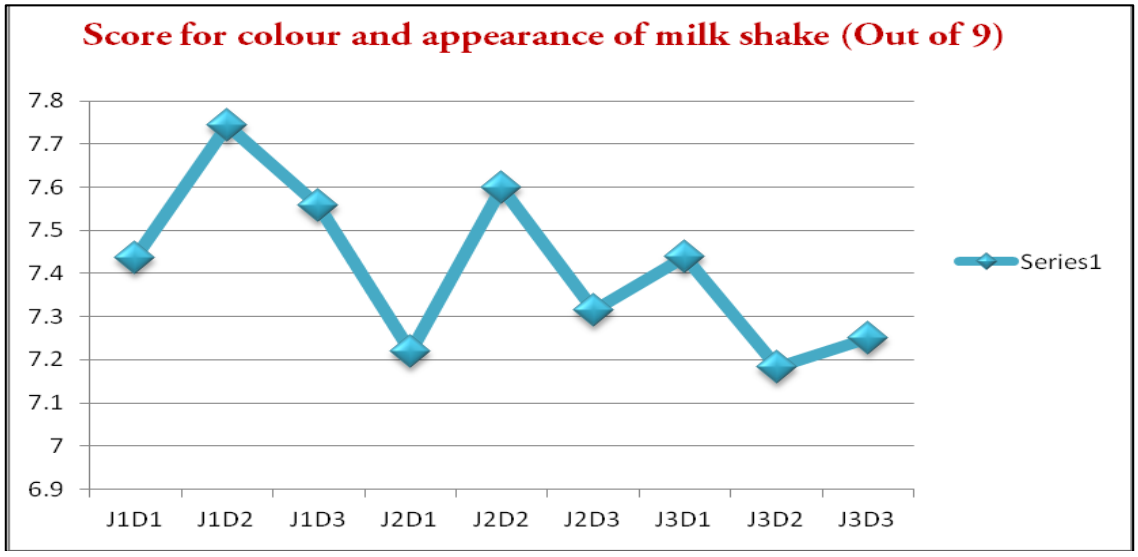

Fig 1: Score of colour and appearance of milk shake (Out of 9)

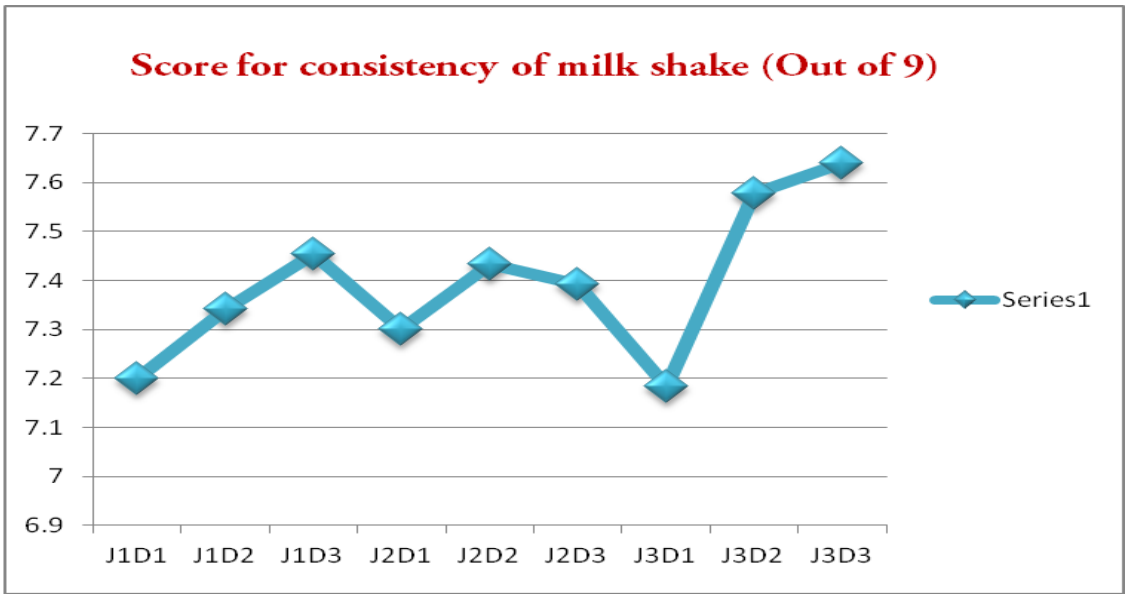

Fig 2: Score for consistency of milk shake (Out of 9)

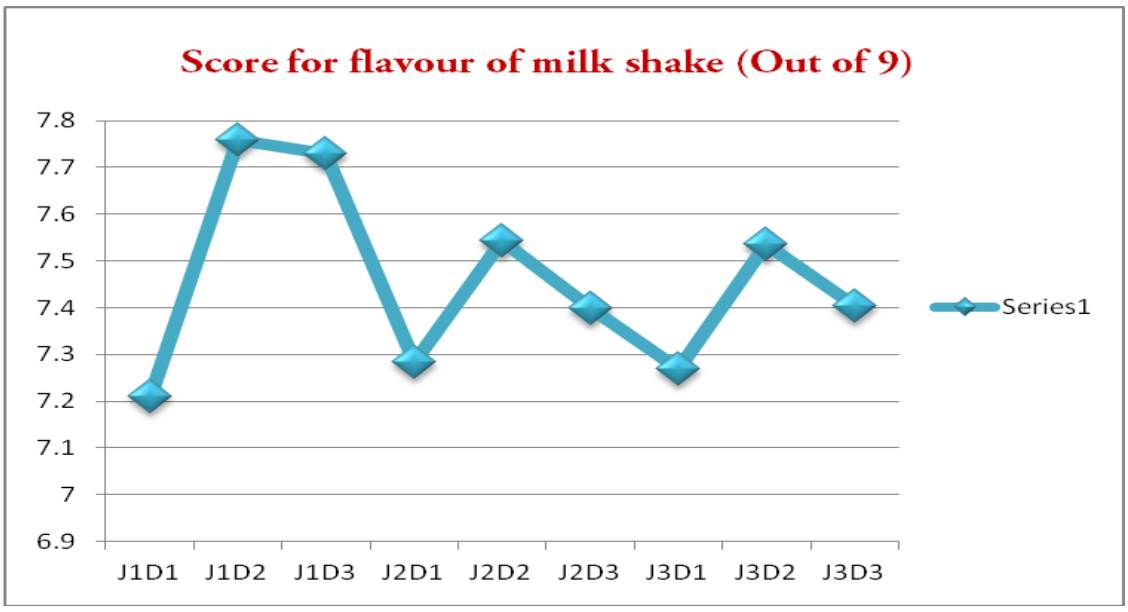

Fig 3: Score for flavour of milk shake (Out of 9)

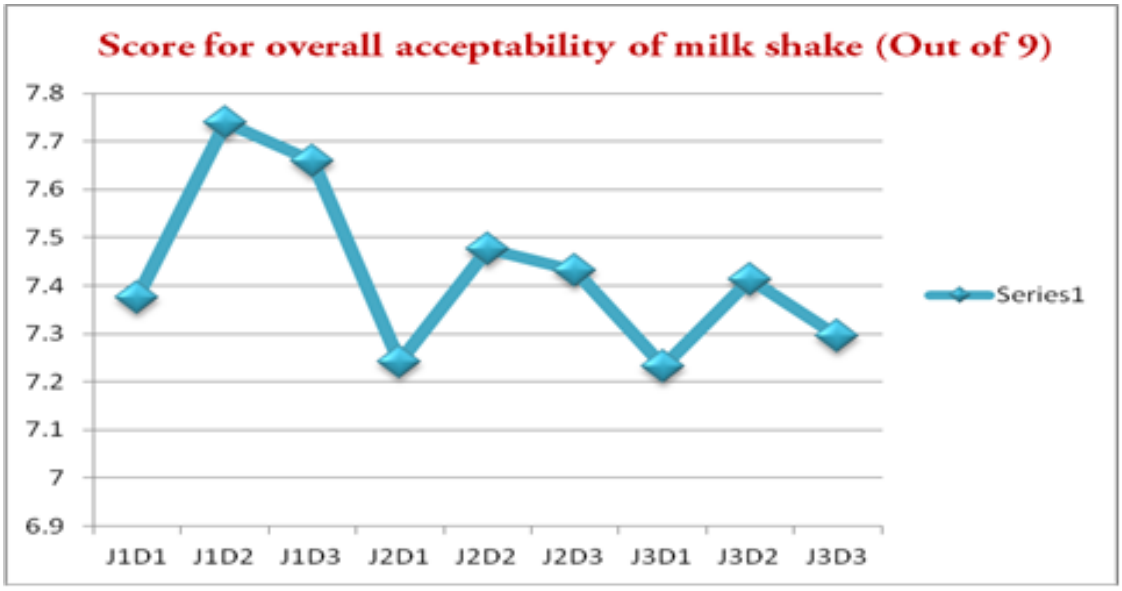

Fig 4: Score for overall acceptability of milk shake (Out of 9)

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