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Studies on sensory characteristics of ginger (*Zingiber officinale* L.) milk shake

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ABSTRACT : India is the largest milk producing country in the world with 114.4 million tones milk production and per capital availability 268g/day (Kalalselvi and Somasundaram, 2011). 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 ice-cream. Ginger is a popular home remedy in India today. The medicinal properties of ginger in preventing cough and cold are well documented taking into account the medicinal properties of ginger, the present research on studies on sensory characteristics ginger (*Zingiber officinale* L.) milk shake by addition of ginger juice control, 2.5 per cent, 5 per cent, 7.5 per cent, 10 per cent of milk (V/V) . Different sensory characteristics are done *i.e.* general apperance, flavaur, concestancy and overall aceptability. Most aceepted treatment found *i.e.* ginger juice 5 per cent of of milk (v/v).

KEY WORDS : Buffalo milk, Ginger, Extraction of ginger juice, Sensory characteristics, Milk shake

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INTRODUCTION

India is the largest milk producing country in the world with 114.4 million tones milk production and per capital availability 268g/day (Kalalselvi and Somasundaram, 2011). Its production and consumption has been on a continuous rise for the last two decades. Now India has been ranked as the first in total milk production. Out of the total milk produced, about 45 to 50 per cent is converted into indigenous dairy products. On the other hand, only 9 per cent of milk is converted into fermented type of milk products and this sector is showing an annual growth rate of more than 20 per cent per annum (Singh, 2006). 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 ice-cream. The milk shake is generally served with some flavour blends. The most commonly used flavour blends are of rose, coffee and chocolate. Ginger, being a major spice, has many uses in food as a flavouring and medicinal products. The aroma of ginger is pleasant with flavour, slightly biting due to antiseptic or pungent compounds present in it, which make it indispensible in the manufacture of number of food products. It is common

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ingredient in Asian cooking. Ginger has a several medicinal properties. According to the Ayurvedic medical system, ginger is carminative, stimulant and gives stimulating remedies. Ginger is diaphoretic, spasmolytic and intestinal stimulant. Fresh ginger has been used for cold induced diseases, asthma, nausea, cough, heart palpitation, swelling and rheumatism.Ginger extracts also have antibacterial, antispasmoctic, antiulcer, antiallergenic and antioxidant qualities as well. Ginger is a popular home remedy in India today. The medicinal properties of ginger in preventing cough and cold are well documented. (Buchman, 1980) There are tendency of some people to refrain from consuming chilled/ cold drinks for fear of caching cold. Ginger milk shake, however, may be acceptable to them. Lately, there are tendency among people to assume a high degree of confidence in wholesomeness and safety of natural foods and natural flavours than those based on chemical.

The foregoing information reveals that blending of milk shake with ginger exact would yield a novel dairy neutracetical. This may improve the acceptability of milk shake and also result into its value addition. However, there is need to standardize certain parameters involved in manufacturing ginger milk shake. It is, therefore, thought essential to evaluate the suitability of ginger juice as a flavouring agent in developing ginger milk shake. Hence, taking into account the medicinal properties of ginger, the present research project on studies on chemical quality ginger (*Zingiber officinale* L.) milk shake was undertaken with the following objectives:

– To study sensory quality of ginger milk shake.

– To standardize the procedure of preparing milk shake by incorporation of ginger juice

– Cost of production of Ginger milk shake.

Technology:

Shukla *et al.* (2003) carried out studies on the development of beverages using fruit juice/ pulp separated milk and reconstituted skim milk. Beverages were prepared by blending juice/ pulp from apples, bananas, guavas, litchis and mangoes at five different concentrations (100, 200, 300 and 400 g /µ) with separated and reconstituted skim milk. Organoleptic evaluation of the beverages showed that apple juice and guava pulp could be blended at upto 300 and 100 g /lit. of milk products, respectively. Banana and mango pulp could also successfully be used at upto 200 g/l in separated milk and reconstituted skim milk. Litchi juice could be blended upto 300 g /l in separated milk and 200 g /l in reconstituted skim milk.

Kashid *et al*. (2007) prepared golden milk shake from different proportions of safflower milk and cow milk *i.e.* 30:70 (T_1),40:60 (T_2), 50:50 (T_3) and 100 per cent cow milk (T_0) was prepared and studied for its acceptability. Golden milk shake prepared from 70 parts cow milk and 30 parts safflower milk was closer to control inacceptability. Golden milk shake prepared from 50 parts of cow milk and 50 parts of safflower milk was also acceptable, scoring between like moderately to like very much, for all sensory attributes. The cost of production of golden milk shake prepared from safflower milk: cow milk (50:50) blend was Rs.11.30 per litre and was more economical than control. Good quality golden milk shake could be prepared by blending cow milk with safflower milk (50:50) with addition of 8 per cent cane sugar and safflower petal extract having known therapeutic value.

MATERIAL AND METHODS

The present M.Sc. work was carried out at the Department of Animal Husbandry and Dairy Science, College of Agriculture, Dapoli- 415 712 dist. Ratnagiri (Maharashtra) during the year 2011-12.

Buffalo milk:

Buffalo milk collected from dairy farm of College of Agriculture, Dapoli.

Ingredients:

Cane sugar, fresh ginger, skim milk power and stabilizer (gelatin) was purchased from local market.

Ginger extract was prepared by procedure described by Patel *et al.* (2007) as per flow process diagram is given in Fig. A. The milk shake will be prepared as per the procedure give by Sharma and Gupta (1978) with slight modifications.

The detail flow process chart for preparation milk shake is given in Fig.B. Treatments: preparation milk shake incorporating the different levels of ginger juice. The detail treatment combination was T_0: No ginger juice (Control), T_1: Addition of ginger juice @ 2.5 per cent of milk. (V/V), T_2: Addition of ginger juice @ 5 per cent of milk. (V/V), T_3: Addition of ginger juice @ 7.5 per cent of milk. (V/V), T_4: Addition of ginger

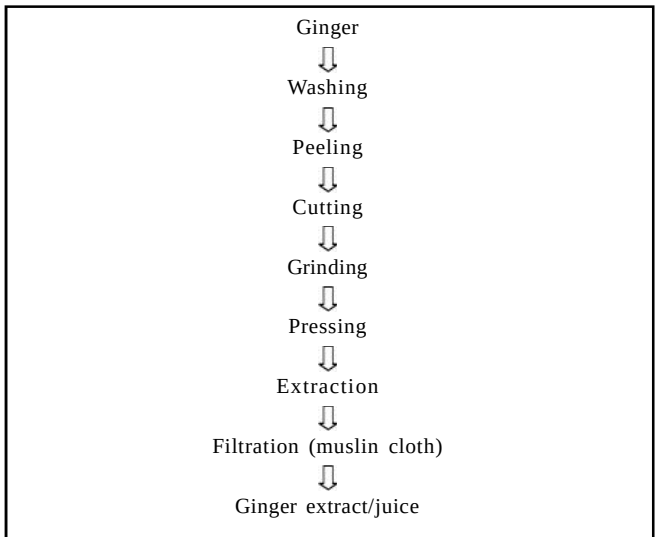

Fig. A: Process flow chart for preparation of ginger extract (Patel *et al.* 2007)

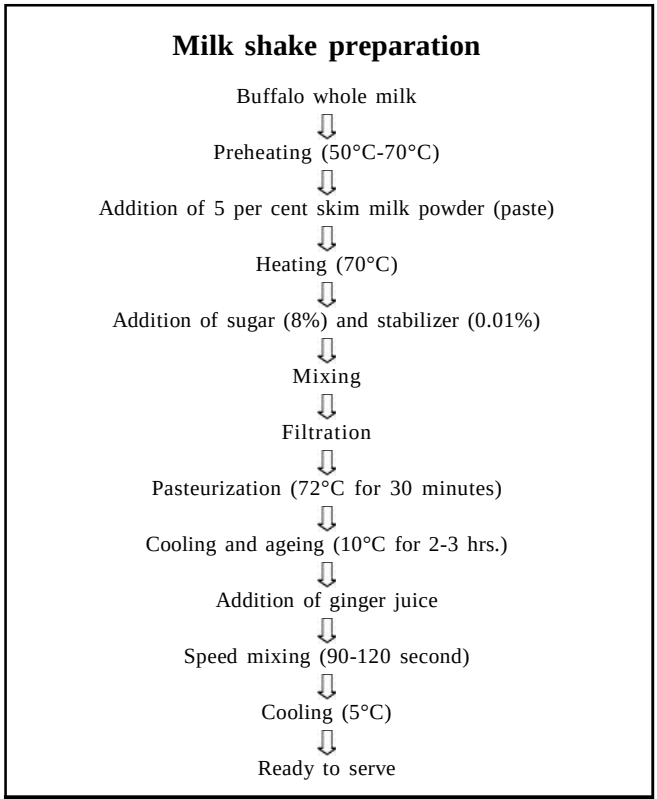

Fig. B: The milk shake was prepared as per the procedure given by Sharma and Gupta (1978) with slight modifications

juice @ 10 per cent of milk. (V/V), cane sugar, Skim milk powder and stabilizer was used @ 8 per cent, 5 per cent and 0.01 per cent of weight of milkfor all treatments, respectively. Each treatment was replicated six times.

Sensory evaluation of ginger milk shake:

The milk shake was evaluated organoleptically for various quality attributes such as general appearance, body and texture (consistency) and flavour by a panel of ten judges. A score card was prepared on the basis of 9 point hedonic scale as described in IS: 6273 (Part- II), 1983.

Statistical design and analysis:

For the present investigation Randomized Block Design was employed using five treatments and six replications. The data were tabulated and analyzed according to the statistical methods prescribed by IS:6273 part-III (1983).

Extraction of ginger juice:

Well matured, fresh ginger rhizomes were selected. Rhizomes were washed in running tap water to remove dirt and dust. For extraction of juice, rhizomes were peeled and then taken into electrically operated fruit juice maker to make juice. The juice was filtered through four fold muslin cloth. Juice obtained was used to mix at different levels during milk shake preparation.

RESULTS AND DISCUSSION

Sensory evaluation of any consumable product is the best method of judging the acceptability of the product by the consumers. The present investigation was undertaken to evaluate sensory quality of milk shake by adding with different levels of ginger jinger juice. The assessment was done by studying the characteristics like general appearance, flavour and consistency of the product by the panel of judges by using “nine point hedonic scale” score card. Each sample was bearing a code number so as to avoid its identity and have impartial results. The results of present research work are average of six time replicated data tabulated, presented and discussed along with Statistical analysis under following main heads.

Sesory charateristics of milk shake :

The proximate analysis of milk shake prepared by using different levels of ginger juice was carried out for general appearance, flavour, consistency and overall acceptability. The results and statistical analysis are

furnished in Table 1.

General appearance:

The data pertaining to sensory score for general appearance at different treatments are given in Table 1.

The general appearance of milk shake should be attractive and uniform. There shall not be any abnormality in the appearance. Normally colour of milk shake varies from light yellow to whitish.

The perusal of data given in Table 1 revealed that score for general appearance increased upto T_2 *i.e.* 5 per cent addition of ginger juice and, thereafter, score was declined simultaneously. The highest score (8.05) was obtained by the treatment T_2 *i.e.* at 5 per cent level of ginger juice and lowest score (7.51) obtained at control (T_0) *i.e.* milk shake without addition of ginger juice. The differences in score for colour and appearance of milk shake due to different levels of ginger juice was significant. The milk shake having no ginger juice was significantly superior to other treatments.

Addition of very small amount of ginger juice did not affect the change in colour. The appearance was very clean with homogenous, consistency.

Flavour:

The data pertinent to sensory score for flavour of different treatments are presented in Table 1.

In general the good, clean, sweet flavour of milk is desired in milk shake. The perusal of data revealed that the highest score (7.72) was obtained by the treatment T_2 *i.e.* at 5 per cent level of ginger juice and lowest score (7.35) obtained in control (T_0) *i.e.* milk shake without addition of ginger. The score for flavour was increased upto 5 per cent level of ginger juice and there after the score was declined with increase in the level of ginger juice in the milk shake. The treatment T_1 (2.5% ginger juice) was significantly superior over rest of treatments. Among all the treatment the treatment T_2 produced clean sweet with typical ginger flavoured acceptable quality milk shake.

Consistency:

The data pertinent to sensory score for consistency of different treatments are depicted in Table 1.

The milk shake having uniform pourable and desirable viscosity is accepted for consumption.The perusal of data revealed that the highest score (7.65) was obtained by the treatment T_2 *i.e.* at 5 per cent level of ginger juice and the lowest score (7.28) obtained for control (T_0) *i.e.* milk shake without addition of ginger juice. Milk shake without addition of ginger juice showed less acceptability product with the score of 7.28 which may be due to very thin consistency of milk shake which was not liked by the judges. The milk shake having 5 per cent ginger juice was significantly superior to other treatments.

Overall acceptability:

The score for the effect of different levels of ginger juice on overall acceptability of milk shake is tabulated in Table 1.

The perusal of data revealed that the score for overall acceptability of milk shake was the highest (7.80) at the treatment T_2 *i.e.* 5 per cent level of ginger juice and the lowest score (7.38) was secured by control (T_0) *i.e.* milk shake without addition of ginger. The difference in score for overall acceptability of milk shake due to treatments was not significant.

On the basis of results obtained it is observed that amongst different levels of ginger juice treatment T_2 (5% ginger juice) was found superior and more acceptable by judges as compared to milk shake of other treatments.

Table 1: Effect of different levels of ginger juice on sensory characteristics of milk shake

Treatments	Sensory parameters (Using 9 point hedonic scale)							
	General appearance		flavour,		Consistency		Overall acceptability	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank
T_0	7.51	5	7.35	5	7.28	5	7.38	5
T_1	7.64	3	7.51	4	7.5	2	7.54	2
T_2	8.05	1	7.72	1	7.65	1	7.80	1
T_3	7.68	2	7.62	2	7.30	4	7.52	3
T_4	7.54	4	7.59	3	7.33	3	7.49	4
Cal x^2 =	13.67		4.167		8.061		9.348	
Table x^2 =	9.49		9.49		9.49		9.49	

Cost of production :

The cost of milk shake production was increased simultaneously with increase in the level of ginger juice. The cost of milk shake production at T_0, T_1, T_2, T_3 and T_4 levels was Rs. 45.00, 47.80, 50.70, 53.50 and 56.40 per kg, respectively. The production cost of milk shake at most acceptable level *i.e.* milk shake with 5 per cent ginger juice (T^2) was Rs. 50.70 per kg. Similar work related to the present investigation was also carried out by Pinto et al. (2004) and Reema *et al*. (2005).

Conclusion:

From the results of the present investigation, it may be concluded that ginger juice could be successfully utilized for preparation of milk shake. Addition of ginger juice in milk shake gave typical flavour and improved the sensory quality and acceptability of the product. Such flavouring did not appreciably affect the composition of milk shake. The most acceptable quality milk shake can be prepared by using 5 per cent ginger juice. The ginger juice be added in milk shake speed mixed cooled and then served. The ingredients cost of production of milk shake having 5 per cent ginger juice was worked out at Rs. 50.70 per kg.

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