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Utilization of menthol (*Mentha arvensis*) juice for the preparation of lassi from cow milk

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Abstract

The present investigation entitled "Utilization of Menthol (*Mentha arvensis*) juice for the preparation of lassi from cow milk" was undertaken during the year 2017-2018. Milk was standardized to 3.5 per cent fat and the lassi prepared in the proportion of 100:0(T₁), 98:2 (T₂), 96:4 (T₃), 94:6 (T₄) and 92:8 (T₅) curd to menthol juice were laid out with five treatments and four replications in completely randomized design (CRD). The data obtained after chemical analysis of fat, protein, total solids, moisture, ash, acidity content and pH values of lassi and evaluation of sensory characteristics like flavour, body and texture and colour and appearance were subjected to statistical analysis. The overall acceptability also analyzed by the same method. The data revealed that fat, protein, moisture percentage and pH values of lassi were decreased with increased in the levels of menthol juice while total solids, ash and acidity percentage were increased with increased in the levels of menthol juice. The lassi prepared with addition of 4 per cent of menthol juice contained 3.24 per cent fat, 3.22 per cent protein, 20.08 per cent total solids, 80.58 per cent moisture, 0.62 per cent ash, 0.84 per cent acidity and 4.25pH. The sensory evaluation carried out by the five judges, showed that the different levels of menthol juice had a significant effect on improving the quality regarding flavour, body and texture, colour and appearance and overall acceptability of lassi. The sensory evaluation indicated that the lassi prepared by blending with 4 per cent menthol juice (T₃) had highest score for flavour (40.62 out of 45), body and texture (33.57 out of 35) and colour and appearance (18.33 out of 20). The overall acceptability of lassi prepared by blending with 4per cent of menthol juice (T₃) had the highest score (8.50 out of 9) by 9 point hedonic scale and ranked as the most acceptable treatment.

Keywords: Menthol juice, lassi, cow milk, physico-chemical quality, sensory attributes

Introduction

Lassi is a fermented dairy product produced from cow's milk with a characteristic sour taste. The product is made in one of two ways. Originally, Lassi was the liquid left over from churning butter from milk, so it is butter milk Lassi /butter milk widely known as "Chhachh" to be the liquid left over after extracting butter from churned curd (dahi). Today, this is called traditional Lassi. On the other hand artificially made, also known as cultured Lassi is a product, made by blending yoghurt with water, salt, spices until frothy. Increasing awareness among consumers to ensure good health coupled with the change in the lifestyle has led to the concept of functional foods. (Singh *et al.* 2012) [8].

Menthol (*Mentha arvensis*) belongs to the family Libeaceae is a common edible and aromatic perennial herb which is cultivated throughout the India. Common name is pudina. The physical-chemical properties of menthol are melting point 43 °C (106-109°F), Freezing point is 27-28 °C, Boiling point is 212 °C (414°F). Molecular formula C₁₀H₂₀O and molecular weight is 156.27 g/mol. The aromatic leaves widely used for flavoring foods and beverages. It is an erect aromatic herb that grows up to 60 cm height with suckers. The stem is cylindrical and the leaves are simple and opposing type. It is used as a contraceptive, carminative, antipeptic ulcer agent and has been given to treat indigestion, skin diseases, cough and colds in folk medicine. In beverages menthol is used for the cooling effect and flavoring, (Yadav *et al.* 2007).

Material and Methods

The research work entitled "Utilization of Menthol (*Mentha arvensis*) juice for the preparation of lassi from cow milk" was undertaken in the Animal Husbandry and Dairy Science Section, College of Agriculture, Nagpur during the year 2017-2018. The clean, fresh and whole cow milk was taken from Animal Husbandry and Dairy Science Section, College of Agriculture, Nagpur. Cow milk was used for conducting the trials throughout the experiment.

Fresh pudina (*Mentha arvensis*) i.e. Menthol leaves were purchased from local market of Nagpur city. Cow milk was used for conducting the trial throughout the experiment. The milk was standardized at 4 per cent fat by the addition of skim milk and cream was followed for adjustment of fat.

The pudina lassi was prepared by using dahi of cow milk having 4 percent fat and 8.5 per cent SNF and pudina leaves extract by method suggested by Sukumar De (2004) with minor modification in respect to quantity of pudina extract and sugar. The pudina leaves extract was optimized by taking its proportion 2, 4, 6 and 8 per cent as per following treatments combinations. The different treatment combination were tried and compared with control (T₁) which was prepared by using cow milk only. The sensory test was conducted to neutralize the effect of pudina extract by using sugar. The quantity of sugar was optimized in pudina lassi by taking of sugar as 15 per cent on the basis of sensory test recorded for test only on 9 point hedonic scale by semi expert panel of judges.

The quality of lassi was judged by sensory evaluation in respect of flavor, body and texture, colour and appearance and overall acceptability by a trained sensory panel on a 9 point hedonic scale. The experiment was laid out in CRD with 5 treatments and 4 replications. The data obtained was analyzed statistically.

Results and Discussion

Fat

The highest fat content i.e. 3.38 per cent was observed in lassi prepared without addition of menthol juice (T₁) whereas, 3.27, 3.24, 3.21 and 3.19 per cent, in the lassi prepared with addition menthol juice at 2% (T₂), 4% (T₃), 6% (T₄) and 8% (T₅) respectively. Fat percentage of lassi was decreased continuously with increased in the level of menthol juice.

Protein

Protein content of lassi was significantly affected due to the addition of different levels of menthol juice. Protein contents were as 3.26, 3.22, 3.17 and 3.15 per cent, in the lassi prepared with addition of menthol juice at 2% (T₂), 4% (T₃), 6% (T₄) and 8% (T₅) respectively. The protein content of lassi was decreases with increase in the level of menthol juice. The highest protein content i.e. 3.31 per cent was observed in lassi prepared without addition of menthol juice (T₁).

Total Solids

Total solids content of lassi increases with the increase in the level of menthol juice. The total solids contained of lassi were as 19.18, 19.26, 20.08, 20.53 and 21.40 per cent, prepared with addition of menthol juice at 0% (T₁), 2% (T₂), 4% (T₃), 6% (T₄) and 8% (T₅) respectively. The maximum total solids content (21.40 per cent) was noticed in lassi with 8 part of menthol juice in T₅ treatment; whereas lowest percentage (19.18 per cent) was noticed in lassi prepared without addition of menthol juice (T₁).

Moisture

Moisture content of lassi was significantly affected due to the addition of different levels of menthol juice. Moisture contents were as 82.51, 80.94, 80.58, 79.85 and 78.56 per cent, in the lassi prepared with addition of menthol juice at 0% (T₁), 2% (T₂), 4% (T₃), 6% (T₄) and 8% (T₅) respectively. The highest moisture content i.e. (82.51%) in lassi prepared without addition of menthol juice (T₁) while moisture content

was lowest (78.56%) in lassi prepared with addition of 8 per cent menthol juice (T₅).

Ash

Ash content of lassi was significantly affected due to the addition of different levels of menthol juice. The ash percentage were as 0.55, 0.59, 0.62, 0.64 and 0.67 per cent, observed in lassi prepared with addition of menthol juice at 0% (T₁), 2% (T₂), 4% (T₃), 6% (T₄) and 8% (T₅) respectively. The ash content of lassi was increase with increases in the level of menthol juice.

Acidity

Acidity content of lassi was significantly affected due to the addition of different levels of menthol juice. The acidity contents in the lassi were as 0.72, 0.73, 0.75, 0.76 and 0.79 per cent prepared with addition of menthol juice at 0% (T₁), 2% (T₂), 4% (T₃), 6% (T₄) and 8% (T₅) respectively.

pH

pH values of lassi was significantly affected due to the addition of different levels of menthol juice. The pH values were 4.32, 4.27, 4.25, 4.21 and 4.19 observed in lassi prepared with addition of menthol juice at 0% (T₁), 2% (T₂), 4% (T₃), 6% (T₄) and 8% (T₅) respectively. The pH value of lassi was decreases with increase in the level of menthol juice.

Sensory evaluation of lassi

Flavour

While studying the effect of different levels of menthol juice on the flavour of lassi, it was found that as the level of menthol juice increased there was a simultaneous increased in the flavour score of lassi. Lassi prepared by using 4 per cent menthol juice (T₃) scored the highest marks (40.62 out of 45) while, the lowest score (33.60 out of 45) secured by the lassi prepared without addition of menthol juice. Statistically, treatment T₃ i.e. 4per cent menthol juice was superior among all treatments and obtained highest score.

Body and texture

The body and texture score of lassi seems to be mainly depends on level of menthol juice added. It was observed that as the level of menthol juice increased, there was simultaneous increased in the body and texture score of lassi. Lassi prepared with 4 per cent of menthol juice (T₃) scored the highest marks (33.57 out of 35) while, the lowest score (27.51 out of 35) secured by the lassi prepared without addition of menthol juice. Statistically, treatment T₃ i.e. 4 per cent of menthol juice was superior among all the treatments and obtained highest score.

Colour and appearance

The colour and appearance score of lassi seems to be mainly depends on level of menthol juice added. It was noticed that as the level of menthol juice increased, there was simultaneous increased in the colour and appearance of lassi. The highest score for colour and appearance was obtained (18.33 out of 20) by the lassi prepared with 4 per cent of menthol juice (T₃) while, the lowest score was secured (17.57 out of 20) by the lassi prepared without addition of menthol juice. Statistically, treatment T₃ i.e. 4 per cent of menthol juice was superior among all the treatments and obtained highest score.

Overall acceptability

The overall acceptability score of lassi on a 9 point Hedonic scale revealed that, the most acceptable product in the present study was observed to be the lassi prepared from 96 per cent cow milk lassi with addition of 4 per cent menthol juice (T₃) with overall acceptable score 8.50 followed by lassi prepared

from 94 per cent cow milk lassi with addition with 6 per cent menthol juice (T₄) scored 7.57 and 8 per cent menthol juice (T₅) scored 7.07 while, the significantly lowest score was obtained by lassi prepared from 100 per cent cow milk lassi without addition of menthol juice (T₁) scored 6.04.

Table 1: Chemical composition of menthol juice (per cent)

Treatments	Fat	Protein	Total solids	Moisture	Ash	Acidity	pH
T ₁ (0% Menthol juice)	3.38	3.31	19.18	82.51	0.55	0.72	4.32
T ₂ (2% Menthol juice)	3.27	3.26	19.26	80.94	0.59	0.73	4.27
T ₃ (4% Menthol juice)	3.24	3.22	20.08	80.58	0.62	0.75	4.25
T ₄ (6% Menthol juice)	3.21	3.17	20.53	79.85	0.64	0.76	4.21
T ₅ (8% Menthol juice)	3.19	3.15	21.40	78.56	0.67	0.79	4.19
S.E. ±	0.031	0.036	0.085	0.143	0.011	0.007	0.013
C.D @ 5%	0.095	0.109	0.257	0.431	0.034	0.022	0.041
Results	Sig	Sig	Sig	Sig	Sig	Sig	Sig

Table 2: Sensory evaluation of lassi as affected by different levels of menthol juice (out of 100)

Treatments	Parameters		
	Flavour (45)	Body & Texture (35)	Colour & Appearance (20)
T ₁ (0% Menthol juice)	33.60	27.51	17.57
T ₂ (2% Menthol juice)	35.71	28.94	17.60
T ₃ (4% Menthol juice)	40.62	33.57	18.33
T ₄ (6% Menthol juice)	38.57	31.95	18.09
T ₅ (8% Menthol juice)	36.38	31.27	17.95
S.E. (m) ±	0.231	0.125	0.051
C. D.	0.697	0.377	0.156
Results	Sig.	Sig.	Sig.

Table 3: Overall acceptability of lassi prepared with different levels of menthol juice on the basis of 9 point Hedonic scale.

S. no.	Treatments	R-I	R-II	R-III	R-IV	Mean
1	T ₁ (0% Menthol juice)	5.90	5.98	6.10	6.16	6.04
2	T ₂ (2% Menthol juice)	6.18	6.42	6.78	6.95	6.58
3	T ₃ (4% Menthol juice)	8.16	8.34	8.67	8.82	8.50
4	T ₄ (6% Menthol juice)	7.19	7.46	7.65	7.98	7.57
5	T ₅ (8% Menthol juice)	6.96	6.99	7.14	7.18	7.07
S.E.(m)±		0.131				
C.D. at 5%		0.397				
Result		Sig.				

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