



SHORT COMMUNICATION

Preparation of Moringa Chhana Spread Using Moringa Leaf Extract from Cow Milk

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ABSTRACT

The present investigation was conducted in the laboratory of the Department of A. H. & Dairying, C.S.A University of Agriculture & Technology, Kanpur. In the experiment moringa leaf extract at three different levels were taken 50 ml, 60 ml, and 70 ml. Cow milk and moringa extract mixed in the ratio of 1:0, 9:1, 22:3, 43:7 and level of salt 1.5%, one level of coagulant (citric acid) and four storage periods 0, 10, 20 & 30 days were taken for flavour, body and texture, colour and appearance, spreadability and overall acceptability. The study revealed that the physical quality of moringa chhana spread from cow milk coagulated by citric acid with 2 per cent, salt level 1.5% at 0 days storage period was found to be better as compared to other treatments. It was also concluded from the present investigation that moringa chhana spread can be stored successfully for 30 days without any significant deterioration at 5° C. The combination of moringa chhana spread with milk: moringa ratio of 9:1 was found best considering for physical qualities.

HIGHLIGHTS

- ① We studied the effect of moringa leaves in chhana spread making.
- ② Using moringa leaves extract in chhana spread making improves flavour, texture, appearance and overall acceptability.

Keywords: Moringa leaf extract, Chhana, Cow Milk, Moringa chhana spread

India is one of the largest milk producers in the world, accounting for 18.5% of world production (NDDDB). The importance of milk and milk product in India has been recognised since Vedic times (five thousand years ago). The significant portion of milk produced in India is converted into a variety of indigenous milk products. Among milk products, chhana is gaining momentum in its production and consumption. Chhana is heat and acid coagulated indigenous milk products which forms the base of several popular Indian sweets like Rasogulla, Sandesh, Rasmalai and Chumchum etc. It originated in eastern part of the country particularly from west Bengal, but now a day it is also popular in north western region of India.

Moringa olerifera, known as drumsticks is native of north India but now, it is available throughout the tropics. Moringa is also known as horse radish tree. It grows fast and the bark is grey, thick and looks cork, peeling in

patches. Chhana spread retains about 90 percent of fat and protein, 50 per cent lactose of the original milk. The energy value of cow chhana ranges from 2866 to 3748 calories per kg. and chhana also retains appreciable proportion of fat solution vitamins like A and D.

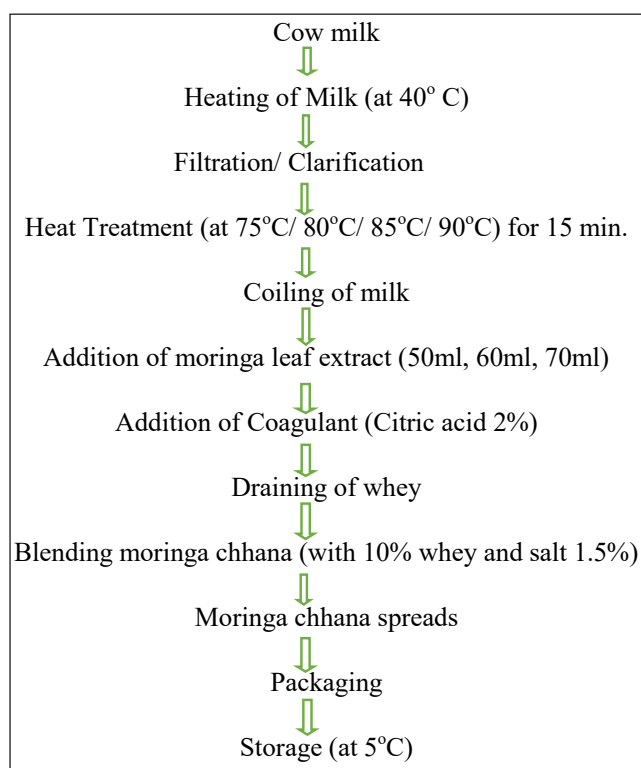
The current experiment was conducted at Chandra Shekhar Azad University of Agriculture and Technology's Department of Animal Husbandry and Dairying. The university dairy farm provided the cow milk. The Moringa chhana spread manufacturing procedure was standardised based on the many criteria under investigation, and the finished product's organoleptic characteristics were assessed.

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The cow milk was heated in karahi, over an open fire to (80°C). The milk was stirred by a ladle during heating to avoid burning. When temperature of milk reached at given temperature 70° C then 50 ml leaf extract, 60ml of leaf extract, 70ml of leaf extract was poured simultaneously. After the coagulation with 2% solution of citric acid was added to the milk slowly with stirring till the complete coagulation took place. After coagulation the stirring was stopped and contents was poured over a piece of clean muslin cloth for straining of whey. After the draining of whey chhana was collected and weighed. After weight, the common salt at 1.5% was mixed with the help of mixer. Required amount of whey was added. Finally, Moringa chhana spread was collected and packed in plastic cups. The sample was stored at refrigeration temperature (5° C) for testing the physico-chemical, microbial qualities and its shelf- life quality.



Flow diagram of Manufacturing of Moringa chhana spreads

Organoleptic tests were used to determine the sensory quality of moringa chhana spread by a panel of five judges from the department of Animal Husbandry and Dairying, Chandra Shekhar Azad University of Agriculture and

Technology, Kanpur. The judges considered flavour, body and texture, colour and appearance, spread ability, and overall acceptability of chhana spread when evaluating the sample. The sensory features of the product were assessed using a 9 point hedonic scale. The findings and discussion of this inquiry have been presented under the following headings.

Flavour of moringa chhana spread is considered to be the main attribute to determine its acceptability. The comparison of different level of moringa and storage period on flavour score of moringa chhana spread, A × B interactions has been given in Table 1.

Table 1: Average flavour score of moringa chhana spread as affected by different moringa level (A) and storage (B)

Treatment	B ₁	B ₂	B ₃	B ₄	Mean
A ₁	7.200	7.000	6.500	6.400	6.775
A ₂	8.200	7.400	6.800	5.700	7.025
A ₃	7.500	7.300	6.800	5.600	6.800
A ₄	7.000	6.800	6.200	5.000	6.250
Mean	7.475	7.125	6.575	5.675	

From table 1 the means of different levels of all the factors for flavour score of moringa chhana spread, the following facts were observed. The maximum 7.025 flavour score was found in A₂ samples while minimum 6.250 in A₄ samples.

In case of storage period B, the maximum 7.475 flavour score was observed in B₁ sample and minimum score 5.675 in B₄ sample.

From interactions of A × B, the maximum score 8.200 was noted in A₂B₁ followed by A₃B₁ and minimum 5.000 in A₄B₄ sample.

Flavour score of moringa chhana spread can be utilized to improve the same by manipulating the levels of moringa leaf extract (A) and storage periods (B). Results were similar to Sachan (2010).

The comparison effect of different types of moringa leaf extracts & storage periods on body and texture score of moringa chhana spread, A × B combinations for body and texture score given in Table 2.

From table 2 the means of different levels of all the factors for body and texture score of moringa chhana spread,

the following facts were observed. The maximum 7.100 body and texture score were found in A_2 samples while minimum 6.325 in A_4 samples. In case of storage period B, the maximum 7.625 body and texture score was observed in B_1 sample and minimum score 5.425 in B_4 sample.

Table 2: Average body and texture score of Moringa Chhana spread affected by the different moringa level (A) and storage periods (B)

Treatment	B_1	B_2	B_3	B_4	Mean
A_1	7.400	7.200	6.700	5.500	6.700
A_2	8.300	7.600	6.900	5.600	7.100
A_3	7.700	7.400	6.900	5.500	6.875
A_4	7.100	6.900	6.200	5.100	6.325
Mean	7.625	7.275	6.675	5.425	

From interactions of $A \times B$, the maximum score 8.300 was noted in A_2B_1 followed by A_3B_1 and minimum 5.100 in A_4B_4 sample.

Chhana spread should have a light greenish colour, mild aroma, and soft elastic texture. The comparison of different moringa leaf extract level and storage periods on colour and appearance score of moringa chhana spread, $A \times B$ combinations for colour and appearance score table 3.

Table 3: Average Colour and Appearances score of Moringa Chhana spread affected by the different moringa leaf extract level (A) and storage periods (B)

Treatment	B_1	B_2	B_3	B_4	Mean
A_1	7.100	6.900	6.400	5.300	6.425
A_2	8.100	7.300	6.700	5.600	6.925
A_3	7.400	7.200	6.700	5.500	6.700
A_4	6.900	6.700	6.100	4.900	6.150
Mean	7.375	7.025	6.475	5.325	

From table 3 the means of different levels of all the factors for Colour and appearance score of moringa chhana spread, the following facts were observed. The maximum 6.925 Colour and appearance score were found in A_2 samples while minimum 6.150 in A_4 samples. In case of storage period B, the maximum 7.375 Colour and appearance score was observed in B_1 sample and minimum score 5.325 in B_4 sample.

From interactions of $A \times B$, the maximum score 8.100 was noted in A_2B_1 followed by A_3B_1 and minimum 4.900 in A_4B_4 sample.

The comparison effect of different types of moringa leaf extracts & storage periods on over all spreadability score of moringa chhana spread, $A \times B$ combinations for body and texture score given in Table 4.

Table 4

Treatment	B_1	B_2	B_3	B_4	Mean
A_1	7.000	6.800	6.300	5.200	6.325
A_2	8.000	7.133	6.600	5.400	6.600
A_3	7.300	7.100	6.600	5.400	6.600
A_4	6.800	6.600	6.000	4.800	6.050
Mean	7.275	6.375	6.375	5.225	

From table 4 the means of different levels of all the factors for spreadability score of moringa chhana spread, the following facts were observed. The maximum 6.808 spreadability score were found in A_2 samples while minimum 6.050 in A_4 samples. In case of storage period B, the maximum 7.275 spreadability score was observed in B_1 sample and minimum score 5.225 in B_4 sample.

From interactions of $A \times B$, the maximum score 8.000 was noted in A_2B_1 followed by A_3B_1 and minimum 4.800 in A_4B_4 sample.

The comparison effect of different types of moringa leaf extracts & storage periods on overall acceptability score of moringa chhana spread, $A \times B$ combinations for body and texture score given in Table 5.

Table 5

Treatment	B_1	B_2	B_3	B_4	Mean
A_1	7.300	7.100	6.600	5.400	6.600
A_2	8.200	7.500	6.800	5.500	7.000
A_3	7.600	7.300	6.800	5.400	6.775
A_4	7.000	6.800	6.100	5.000	6.225
Mean	7.525	7.175	6.575	5.325	

From table 4 the means of different levels of all the factors for overall acceptability score of moringa chhana spread, the following facts were observed. The maximum 7.000 overall acceptability score were found in A_2 samples while minimum 6.225 in A_4 samples. In case of storage period B, the maximum 7.525 overall acceptability score was observed in B_1 sample and minimum score 5.325 in B_4 sample.



From interactions of $A \times B$, the maximum score 8.200 was noted in A_2B_1 followed by A_3B_1 and minimum 5.00 in A_4B_4 sample.

CONCLUSION

On the basis of sensory, chemical and microbial evaluation of moringa chhana spread samples prepared from cow milk by using different moringa extract level and storage periods, it is concluded that an excellent quality moringa chhana spread could be prepared from cow milk using 2% citric acid, 1.5% salt, 50ml moringa leaf extract in 450 ml of milk and 0 days storage period. It is also concluded from the present investigation that these moringa chhana spread samples can be stored successfully for 30 days without any significant deteriorations at 5° C.

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