International Journal of Food Science and Nutrition
ISSN: 2455-4898; Impact Factor: RJIF 5.14
Received: 21-06-2019; Accepted: 25-07-2019
www.foodsciencejournal.com
Volume 4; Issue 5; September 2019; Page No. 89-91

Production and quality evaluation of soya cheese from a blend of cow milk and soya milk

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Abstract
Soya cheese is reported to be low in cholesterol and can help to alleviate bone loss and also for preventing heart diseases and certain cancer. The present study was conducted to prepare soya cheese blending cow milk and soya milk in different proportion i.e.T_0 100:00%, T1 95:05%, T2 90:10 % T3 85:15 and T4 80:20. Soya cheese was evaluated for physico-chemical, microbial and sensory quality parameters. Based on this evaluation, T_3 (85:15) which was prepared by using 85% cow milk with 15% soya milk was found to be the most accepted and the best product. It contain carbohydrate-4.84%, protein-19.90%, fat-13.20%, ash-3.76%, total solid-41.70%, moisture-58.30%, acidity-0.63%, calcium-271.50 (mg) and calorific value-217.76 per 100gm respectively.

Keywords: soya cheese, cow milk, soya milk, organoleptic evalution, compositional analysis

1. Introduction
Cheese is a popular food product. Cheese making started out as an accidental curdling of milk. Cheese is a nutrient-dense food. Cheese provides a high concentration of nutrients relative to its energy content. The nutritional composition of cheese depends on the type of milk used and the manufacturing and ripening procedures. Therefore, cheese contains relatively small amounts of the water soluble constituents (whey proteins, lactose, and water-soluble vitamins), which partition mainly into the whey. None of the milk components is fully retained in cheese and new substances may be added, notably salt. The continuous increase in population and inadequate supply of protein has inadvertently increased the occurrence of malnutrition in developing countries. However, in order to meet the protein demands in developing countries, where animal protein is also grossly inadequate and relatively expensive, research effort is geared towards finding alternative sources of protein from legume seeds. It must be stressed that for the selective few that are able to afford animal milk, there is always an increasing concern about its fat and cholesterol contents. This factor has made vegetable milk to become an alternative source of milk. In this regard, soy cheese has been recognized as being nutritionally helpful. ompostition of cow milk and typical soya milk

Table 1: Compostition of cow milk and typical soya milk

Composition	Soybean Milk%	Cow's Milk %
Carbohydrate	5.00	5.00
Protein	3.60	3.30
Fat	1.52	4.00
Ash	0.79	0.70
Total Solids	10.91	13.00
Moisture	89.09	87.00
Iron	0.0010	0.0002
Calcium	0.025	0.114
Calories Per Ounce	13.7	19.7

2. Materials and methods
2.1 Procurement and collection of ingredients
a. Soybean: Was purchased from local grocery shop of Prayagraj, U.P.
b. Cow milk: Was purchased from local grocery shop of Prayagraj, U.P.
c. Rennet: was purchased from NDRI, Karnal.
d. Culture: Was purchased from NDRI, Karnal.
e. Salt: Was purchased from local grocery shop of Prayagraj, U.P.

2.2 Treatement combination (In ratio)

Table 2

Treatment	Cow milk (ml)	Soybean milk (ml)
T_0	100	00
T_1	95	05
T_2	90	10
T_3	85	15
T_4	80	20

2.3 Plan of work

The Experiment "Production and quality evaluation of soya cheese from a blend of cow milk and soya milk" Will be carried out in research lab of Warner College of Dairy Technology, Sam Higginbottom University of Agriculture Technology and Sciences, Allahabad-211007.

2.4 Development of product

2.4.1 Flow chart for manufacturing of experimental soya cheese.

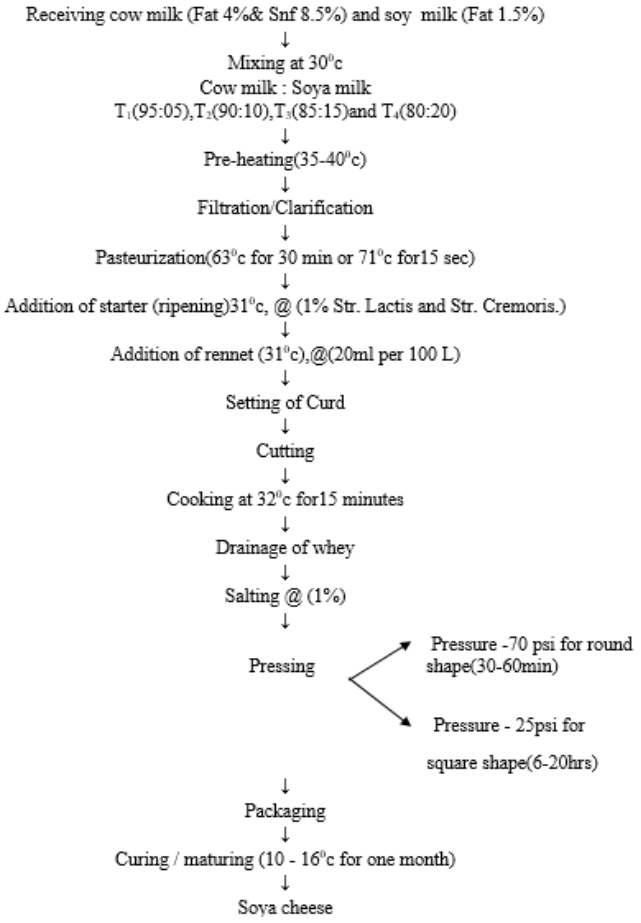

Fig 1

3. Results and discussion

3.1 Chemical characteristics

1. Carbohydrate percentage in soya cheese**,** highest mean carbohydrate percentage was recorded in T_0(5.70) followed by T_1(5.60) T_2(5.53), T_3(4.84) and T_4(4.69).
2. Protein percentage in soya cheese, highest mean protein percentage was recorded in T_4(20.20) followed by T_3(19.90), T_2(19.50), T1(19.20) and T_0(19.00).
3. Fat percentage in soya cheese, highest mean fat percentage was recorded in T_0 (16.30) followed by T_1 (15), T_2 (14.10), T_3 (13.20) and T_4 (12.50).
4. Ash percentage in soya cheese, highest mean was recorded in T_0 (4.10) followed by) T_1 (4.00), T_2(3.87), T_3(3.76) and T_4(3.61).
5. Total solids percentage in soya cheese, highest mean total solid percentage was recorded in T_0 (45.10) followed by T_1 (43.80), T_2 (43.00) T_3, (41.70), and T_4(41.00).
6. Moisture percentage in soya cheese, highest mean moisture percentage was recorded in T_4 (59.00) followed by T_3 (58.30), T_2(57), T_1 (56.20) and T_0(54.90).
7. Acidity percentage in soya cheese, highest mean acidity percentage was recorded in T_4(0.67) followed by T_3(0.66),T_2(0.64), T_1(0.63), and T_0(0.61).
8. Calcium percentage in soya cheese, highest mean calcium percentage was recorded in T_0(317.09) followed by T_1(302.15), T_2(290.70),T_3(271.50)and T_4(255.10).
9. Calorific value percentage in soya cheese, highest mean calorific value percentage was recorded in T_0(245.47) followed by T_1(234.16) T_2(226.94),T3(217.07) and T_4(212.10).

3.2 Organoleptic characteristics

1. Colour and appearance score in soya cheese, the highest colour and appearance score was recorded in T_3(8.56) followed by T_2 (7.86), T_1 (7.56) T_4(7.35)& T_0 (7.12).
2. Body and texture score in soya cheese, the highest body texture score was recorded in T_3(8.38) followed by T_2 (8.10), T_1 (8.08) T_0(8.01) & T_4(7.90).
3. Flavor score in soya cheese, highest score was recorded in T_3(8.12) followed by T_2 (8.02), T_1 (7.90) T_0(7.48)& T_4 (7.40).
4. Overall acceptability score in soya cheese, the highest score was recorded in T_3(8.48) followed by T_2 (8.38), T_1 (8.28) T_4(7.90)& T_0 (7.70).

3.3 Microbial characteristics

1. Standard plate count content in soya cheese, highest mean standard plate count was recorded in T_0(19.00) followed by T_1 (17.60), T_3 (16.80) T_2(16.60)& T_4 (12.20).
2. Yeast & mould count in soya cheese, highest mean yeast & mould count was recorded in T_0(7.80) followed by T_1 (6.40), T_2(6.20) T_3(5.40)& T_4 (4.80).
3. Coliform test in control and experimental soya cheese were found to be absent.

Table 3: Master table of experimental soya cheese.

Parameter	T0	T1	T2	T3	T4
1 Physico-chemical analysis					
Carbohydrate %	5.70	5.60	5.53	4.84	4.69
Protein %	19.00	19.20	19.50	19.90	20.20
Fat %	16.30	15.00	14.10	13.20	12.50
Ash %	4.10	4.00	3.87	3.76	3.61
Total soilds %	45.10	43.80	43.00	41.70	41.00
Moisture %	54.90	56.20	57.00	58.30	59.00
Acidity %	0.67	0.66	0.64	0.63	0.61
Calcium mg	317.09	302.15	290.70	271.50	255.10
Calorific Value per 100 gm	245.50	234.20	227.02	217.76	212.03

2. Organoleptic scores (9 point hedonic scale)					
Colour & Appearance	7.12	7.56	7.86	8.56	7.35
Body & Texture	8.01	8.08	8.10	8.38	7.90
Flavor	7.48	7.90	8.02	8.12	7.40
Overall acceptability	7.70	8.28	8.38	8.48	7.90
3. Microbiological analysis					
SPC ($x10^3$ cfu/gm)	19.00	17.60	16.60	16.80	12.20
Yeast & Mould count(/g)	7.80	6.40	6.20	5.40	4.80
Coli form	Nil	Nil	Nil	Nil	Nil
4. Cost of production					
Soya Cheese (in rupees/ 100gm)	32.56	31.37	30.18	29	27.80

4. Conclusion

From the results it is concluded that the soya cheese can be successfully prepared by using cow milk and soya milk, it was found that treatment T_3 (cow milk 80**:** soya milk 20) was best in terms of organoleptic characteristics among all treatments and received highest score in organoleptic evaluation. Optimized product of soya cheese was best in microbial characteristics as well as physico-chemical characteristic.

5. References

1. AOAC. Methods of Analysis: 18th Ed. Washington, DC: Association of Official Analytical Chemists, 2006.
2. Burnett RS. Soybean protein food products. In "Soybeansand Soybean Products, Vol. I., Chap. XXIV, Ed. Markley. Interscience Publishers, Inc., New York, 1951.
3. Fuji Oil Co. Ltd. Soybean milk, British Patent 1438315. (Food Sci, and Technol. Abst. 1977, 2H251).
4. Kim *C*S, Shin SH. Studies on the preparation of a cheese-like product from soybean milk, Korean J. Food Sci. and Tech. 3(1):57. Dept, of Food Tech., Coll. Of Eng., Dong Kuk Univ., Seoul, S. Korea. (Food Sci. and Tech. Abst. 1971. 12G478).
5. Rackis JJ. Biological and physiological factors insoybeans. Am. Oil Chem. Soc. 51:161A, Rice, R. D. Lipoxidase inactivation in the whole soybeanand its effects on extracted oil and meal quality. Univ. ofIllinois, Urbana, 1973-1974.
6. Schroder DJ, Jackson H. Preparation of soybean cheese using lactic starte organisms. 3. Effects of mold ripening and increasing concentrations of skim milk solids. J. Food Sci. 1971; 36(1):22.
7. Schroder DJ, Jackson H. Preparation and evaluation of soybean curd with reduced beany flavor. J. Food Tech. 1972; 37:450.
8. Yan TC. Studies of the physical and chemical properties of soymilk. Thesis. Cornell University, 1927.