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Studies on quality parameters of khoa burfi prepared with orange rind

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Abstract

Milk has been recognized as a complete food by nutritionists all over the world. It has all the ingredients and nutrients necessary for growth and maintenance of a healthy human body. Indian scripture have been described milk as the elixir of life or Amrita.

Orange rind is very important with the following aspects. It lowers high blood pressure and cholesterol, anti-Allergetic, anti-inflammatory, improves oral health, boosts immune system, anti - cancer activity, protects respiratory system, improves digestive system, helps with weight loss, and cure from asthma.

Khoa burfi with orange rind was prepared from different preparation of orange rind. The product obtained was subjected for chemical analysis and organoleptic evaluation by panel of judges. On an average the carbohydrate content of khoa burfi with orange rind was found to be 46.264, 46.708, 47.262 and 47.394 per cent, protein 13.56, 13.54, 13.74 and 13.75 per cent, fat 19.238, 18.112, 17.904 and 17.110 per cent, ash 2.378, 2.386, 2.418 and 2.426 per cent, Total solid 81.480, 81.300, 81.770 and 80.680 per cent and Moisture 18.56, 18.70, 19.24 and 19.32 per cent, acidity 0.45, 0.51, 0.59 and 0.67 per cent, antioxidant activity 2.674, 3.068, 3.975 and 4.114 per cent, crude fiber 1.526, 2.274, 2.509 and 2.848 per cent, for treatment T0, T1, T2 and T3, respectively. It was also observed that as the orange rind. Increased, there was decrease in carbohydrate, protein, ash, moisture acidity, antioxidant activity, and crude fiber content of khoa burfi orange rind and decrease in fat and total solid content. It was also observed that the overall acceptability score for treatment T0, T1, T2 and T3 was 7.886, 7.794, 8.008 and 7.834, respectively. The cost of control burfi was found to be highest for T3 as Rs.548.5 per kg. The lowest cost was recorded for treatment T0 as Rs.424.3 per kg. The cost for treatment T1 and T2 were Rs.487.3 and Rs.518.5 per kg, respectively. It can be concluded that the orange rind can be very well utilized for preparation of nutritious, palatable and low cost burfi 10 per cent orange rind with 70 per cent khoa and 20per cent sugar on weight basis.

Keywords: Carbohydrate, protein, fat, antioxidant activity, crude fiber

Introduction

Milk has been recognized as a complete food by nutritionists all over the world. It has all the ingredients and nutrients necessary for growth and maintenance of a healthy human body.

Since time immemorial, a significant proportion of milk has been used in India for preparing wide variety of dairy delicacies- an unending array of sweets and other specialties from different regions of the country. In the process, the basic limitation of milk- its perishable nature has been tastefully overcome. It's processing aims to extend the shelf life of milk, while converting it to mouth watering tit-bits. Thus, diverse method to prepare as well as preserve milk products have been developed. About 50-55 per cent of milk produced in India is converted in to variety of the traditional milk product. Over the millennia, these processes have largely remained unchanged, being in the hands of halwais, the traditional sweetmeat makers, who forms the core of this cottage industry.

Burfi: *Burfi* is one of the highly nutritious *Khoa* based indigenous milk products prepared from cow or buffalo milk, as it contains a considerable amount of milk solids. Sugar is added in different proportions and other ingredients are incorporated according to the demand of consumers. Several varieties of *Burfi* are sold in the market, depending upon the additives present, viz., *Mawa Burfi*, *Pista Burfi*, *Chocolate Burfi*, *Coconut Burfi* and *Rava Burfi*. Good quality *Burfi* is characterized by moderately sweet taste, soft and slightly greasy body and smooth texture with very fine grains. It retains its quality for a considerable long period at atmospheric storage temperature due to its low moisture content and higher concentration.

Orange rind

Orange rind prepare by the orange peel after the cutting of peel in small Peices and after then it will be boiled in water then slowly will add in sugar solution adding,

peel is an external layer of orange fruit and waste part of orange but it can be used as flavor in burfi.

Materials and Methods

The study entitled "Study on preparation of khoa burfi with orange rind" was carried out at the Department of Warner College of Dairy Technology (SHUATS) Prayagraj, Uttar Pradesh, during the year 2017-2019.

Procurement and collection of ingredients

Milk: It was collected from the local market of Prayagraj.

Sugar: It was purchased from the local market of Prayagraj.

Orange rind: It was self-prepared.

Material required

1. Whole Milk

Fresh whole milk of buffalo (fat 6 per cent and SNF 9 per cent) procured from Students of Aggies Dairy Plant Warner College of Dairy Technology was used for the preparation of Orange rind burfi.

2. Sugar

Good quality clean crystalline sugar was purchased from the local market.

3. Orange rind

4. Butter paper

5. Stainless steel Khunti of about 40 cm length with 9 cm width was having flattened end with a relatively sharp edge and long handle was used for scraping milk solids over the heating surface of karahi during the *khoa* and *burfi* making.

6. Stainless steel trays Stainless steel trays having 45 cm length, 25 cm width and 2 cm height were used for cooling of *burfi* mass.

1. Orange rind
2. Khoa
3. Sugar

A. Procurement and collection of ingredients

All the ingredients were collected from the local market.

B. Equipment's

1. Weighing balance
2. Airtight glass bottle for rind
3. LPG stove
4. Stainless steel karahi
5. Laddle
6. Spoon

C. Miscellaneous

1. Measuring cylinder, beaker,

Table 1: Treatment combination (Ratio)

Treatment	Khoa (%)	Sugar (%)	Orange rind (%)
T0	80	20	0
T1	70	20	10
T2	65	20	15
T3	60	20	20

The following analyses were conducted during the investigation

1. Chemical analysis

- Carbohydrate
- Protein
- Colour & appearance
- Body & texture
- Flavour & taste
- Overall acceptability
- Fat
- Ash
- Total solid
- Moisture
- Acidity
- Antioxidant activity
- Crude fiber

2. Sensory evaluation

- Colour & appearance
- Body & texture
- Flavour & taste
- Overall acceptability

3. Microbial analysis

- Coliform count
- Standard plate count (SPC)
- Yeast & Mould count

4. Statistical analysis: The data obtained in the present investigation was tabulated. The data were analyzed statistically by using Randomized Block Design (RBD)

- Treatment : 4
- Replication: 5
- Total no. of traits: 20

5. Cost analysis: The cost calculation of orange rind burfi was estimated using the amount of ingredients used and their price per Kg.

Results and Discussion

The study entitled "Study on preparation of khoa burfi with orange rind" was carried out at the Department of Warner College of Dairy Technology (SHUATS) Prayagraj, Uttar Pradesh, during the year 2017-2019. The following observations were made.

Chemical parameters were studied

Physico-chemical analysis: The mean chemical composition of *orange rind burfi* prepared with different concentrations of orange rind is presented in Table

Table 2: Physico-chemical property

Treatments	Carbohydrate %	Protein %	Fat %	Ash %	Total solids %	Moisture%	Acidity%	Antioxidant %	Crude fiber %
T0	46.264	13.56	19.238	2.378	81.480	18.56	0.45	2.674	1.526
T1	46.708	13.54	18.112	2.386	81.300	18.70	0.51	3.068	2.274
T2	47.262	13.74	17.904	2.418	80.770	19.24	0.59	3.975	2.509
T3	47.394	13.75	17.110	2.426	80.680	19.32	0.67	4.114	2.848

Carbohydrate

From the above data on Carbohydrate percentage in sample of different and control the highest mean Carbohydrate Percentage were recorded in the sample of T3 (47.394) Followed by T2(47.262), T1 (46.708), T0 (46.264), The difference in these values of Carbohydrate percent all treatment were significant.

Protein

From the above data on Protein percentage in sample of different and control the highest mean Protein percentage were recorded in the sample of T3 (13.75) Followed by T2 (13.74), T1 (13.54), T0 (13.56), The difference in these values of Protein percent all treatment were significant.

Fat

From the above data on Fat percentage in sample of different and control the highest mean fatcontent were recorded in the sample of T3 (17.110) Followed by T2 (17.904),T1 (18.112) T0 (19.238), the difference in these values of fat percent all treatment was significant.

Ash

From the above data on Ash content in sample of different and control the highest mean ashcontent were recorded in the sample of T3 (2.426),Followed by T2 (2.418),T1 (2.386),T0 (2.378), the difference in these values of ash percent all treatment were significant.

Total solids

From the above data on Total solids Percentage in sample of different and control the highest Mean Total solids percentage were recorded in the sample of T0 (81.480) Followed by T1 (81.300), T2 (80.770), T3 (80.680), The difference in these

values of Total solids percent all treatment were significant.

Moisture

From the above data on Moisture Percentage in sample of different and control the highest mean Moisture Percentage were recorded in the sample of T3 (19.32), Followed by T2 (19.24), T1(18.70), T0 (18.56), the difference in these values of Moisture percent all treatment were significant.

Acidity

From the above data on acidity percentage in sample of different and control the highest mean Acidity percentage were recorded in the sample of T3 (0.67) Followed by T2 (0.59), T1 (0.51),T3 (0.45), the difference in these values of Acidity percent all treatment were significant.

Antioxidant activity

From the above data on Antioxidant activity percentage in sample of different and control the Highest mean Antioxidant activity percentages were recorded in the sample of T3 (4.114) Followed by T2 (3.975), T1 (3.068), T0 (2.674), The difference in these values of Antioxidant activity percent all treatment were significant.

Crude fiber

From the above data on Crude fiber percentage in sample of different and control the highest mean Crude fiber percentage were recorded in the sample of T3 (2.848) Followed by T2 (2.509)T1 (2.274), T0 (1.526), the difference in these values of Crude fiber percent all treatment were significant.

Physico-Chemical Analysis

This graph representing the Carbohydrate, Protein, Fat, Ash, and Total solids in percentage.

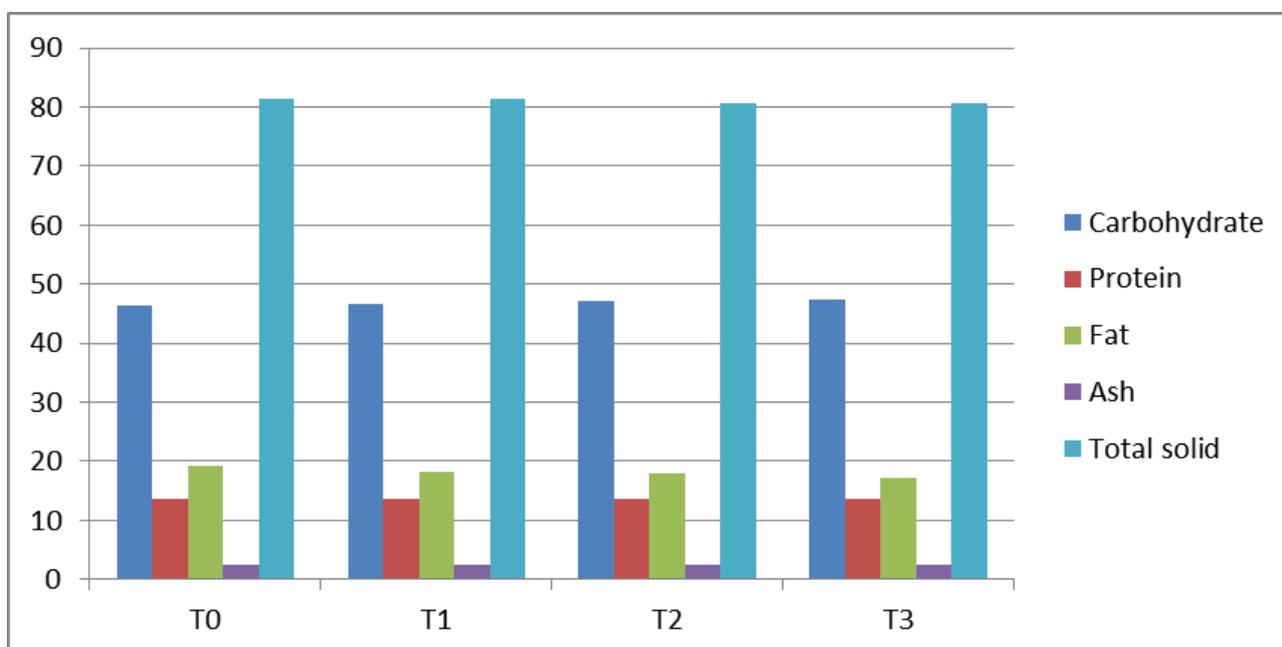


Fig 1: This graph representing the Physico- chemical property

This graph representing the Moisture, Acidity, Antioxidant and Crude fiber in percentage.

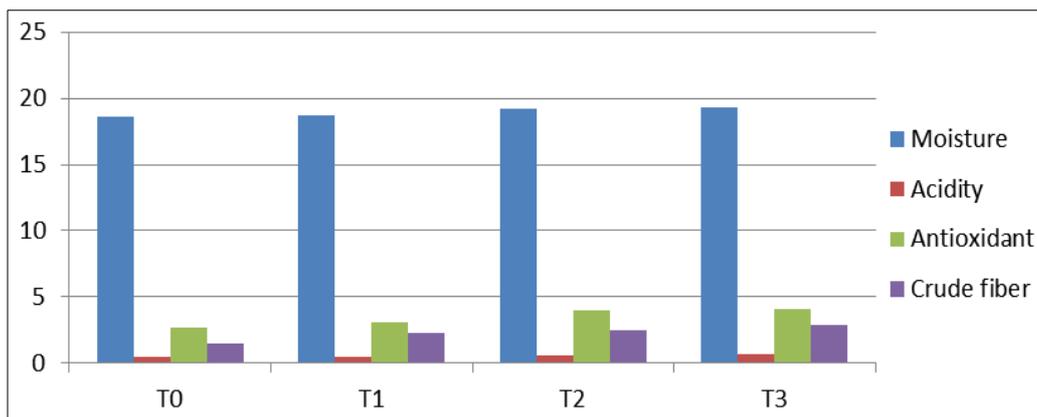


Fig 2: This graph representing the Physico- chemical property

Table 3: Microbial parameters were studied

Treatments	Coliform	SPC ($\times 10^3$ cfu /g)	Yeast & mould (par/g)
T0	NIL	12.2	5.2
T1	NIL	12	5.6
T2	NIL	11.6	4.4
T3	NIL	10	4.2

SPC ($\times 10^3$ cfu /g)

From the above data on SPC ($\times 10^3$ cfu /g) in sample of different and control the highest mean SPC ($\times 10^3$ cfu /g) were recorded in the sample of T0 (12.2) Followed by T1 (12), T2 (11.6), T3(10), The difference in these values of SPC ($\times 10^3$ cfu /g)all treatment were significant.

Yeast & mould (par/g)

From the above data on Yeast & mould(par/g)in sample of different and control the highest mean Yeast & mould (par/g) were recorded in the sample of T1 (5.6) Followed by T0 (5.2), T2 (4.4), T3(4.2), The difference in these values of Yeast & mould (par/g) all treatment were significant.

Coliform

The Coliform count in control and experimental sample of burfi were found to be absent.

Microbial Analysis

This graph representing the Coliform.SPC ($\times 10^3$ cfu /g) and Yeast & mould in percentage.

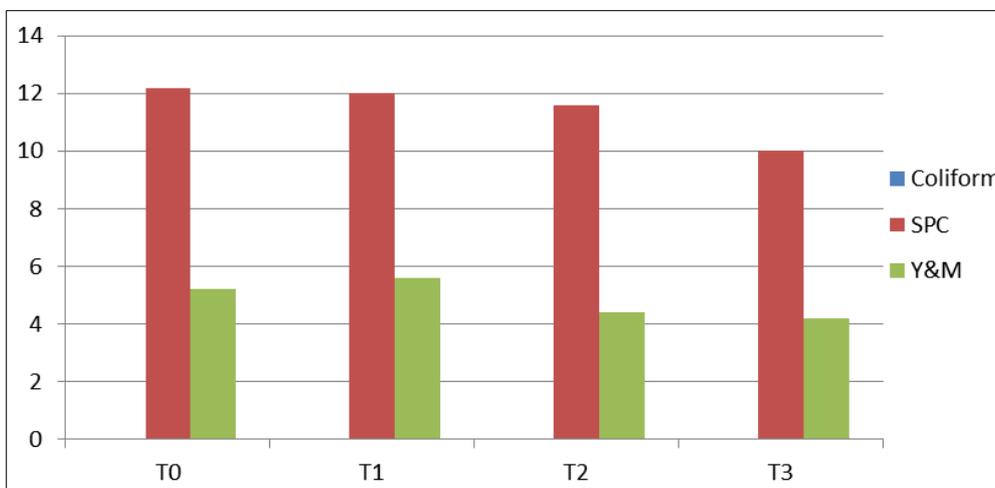


Fig 3: This graph representing the Microbial parameters were studied

Table 4: Organoleptic Parameters were studied

Treatments	Colour & Appearance	Body & Texture	Flavour	Overall Acceptability
T0	8.08	7.68	7.92	7.886
T1	7.92	7.6	7.8	7.794
T2	7.78	7.54	7.78	8.008
T3	7.76	7.46	7.7	7.834

Colour & Appearance

Colour and appearance in sample of different and control the highest mean colour and appearance were recorded in the sample of T3 (7.76) Followed by T2 (7.78), T1 (7.92), T0 (8.08), the difference in these values of Colour & appearance all treatment were significant.

Flavour & taste

From the above data on Flavour & taste in sample of different and control the highest mean Flavour & taste were recorded in the sample of T3 (7.7) Followed by T2 (7.78), T1 (7.8), T0 (7.92), the difference in these values of Flavour & taste all treatment were significant.

Body & texture

From the above data on Body & texture in sample of different and control the highest mean Body & texture were recorded in the sample of T3 (7.46) Followed by T2 (7.54), T1 (7.6), T0 (7.68), the difference in these values of Body & texture all treatment were significant.

Overall acceptability

From the above data on Overall acceptability in sample of

different and control the highest mean Overall acceptability were recorded in the sample of T3 (7.834) Followed by T2 (8.008), T1 (7.794), T0 (7.886), the difference in these values of Overall acceptability all treatment were significant.

Organoleptic Score

This graph representing the Colour & Appearance, Body & Texture, Flavour and Overall Acceptability in percentage.

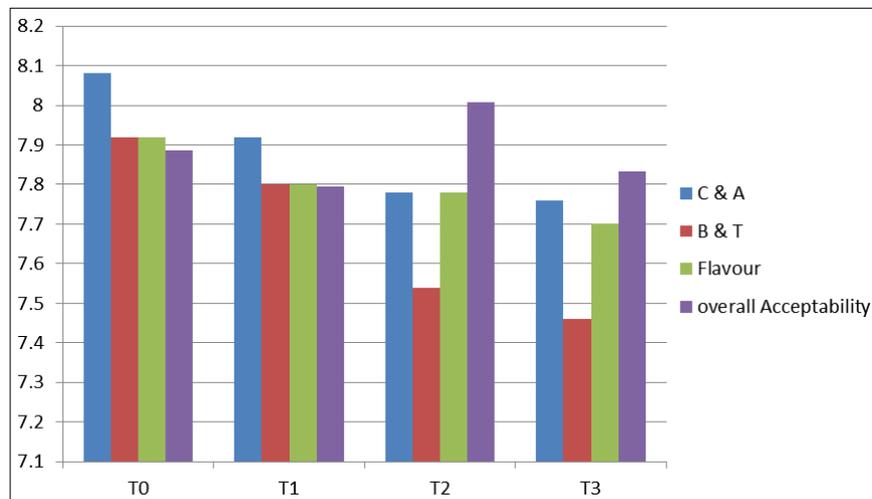


Fig 4: This graph representing the Organoleptic Parameters were studied

Conclusion

From present investigation it concluded that the Orange rind can be very well utilized for preparation of palatable and low cost *burfi* by 20 per cent Orange rind with 80 per cent *khoa* on weight basis.

The product obtained was subjected for chemical analysis and organoleptic evaluation by panel of judges. It was observed that as the Orange rind increased, there was increase in fat and moisture. Also, there was decrease in protein, ash, carbohydrate and total solids content of *khoa burfi* with Orange rind. It was also observed that the overall acceptability score for treatment T0, T1, T2 and T3 was 7.886, 7.794, 8.008 and 7.834 respectively.

The sample of treatment T2 was more acceptable than treatment T1 and T3. The cost for treatment T2 was Rs.518.5/kg. It may therefore, be concluded that the *burfi* of 15 per cent Orange rind in *khoa* is fairly acceptable, comparatively cheaper and adaptable as far as processing technology is concerned.

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