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PROXIMATE ANALYSIS OF RASMALAI INCORPORATED WITH POMEGRANATE PEEL

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ABSTRACT
Rasmalai is a famous traditional dairy product. Rasmalai consists of flattened balls of chhana soaked in sweetened concentrated milk and is flavoured with cardamom. Milk is boiled and a bit of vinegar is added to split it. The whey is discarded and the milk solids are drained, cooled and kneaded into a dough. The dough is divided into small balls and the balls are cooked in sugar syrup. The balls are then cooked in milk with saffron. The origin of the Rasmalai is from Bengal region. In this study the Rasmalai is incorporated with the Pomegranate peel powder at various concentrations like 2%, 4% and 6%. The sensory evaluation and proximate analysis of the treated Rasmalai has been detailed in this study. The 2% incorporated Rasmalai possess good sensory attributes than other concentrations. Overall, this study showcases the successful development of a Rasmalai incorporated with the Pomegranate peel powder

***Keywords**: Rasmalai, Pomegranate Peel Powder and Chhana*

INTRODUCTION

Rasmalai is a traditional dairy product from India. A common Indian dessert fashioned with chhana balls is called rasamalai. It is a very delicate, spongy and chewy sweet that has a delectable taste (Aneja *et al.,* 1990), (Sharma *et al.,* 2014) described Rasmalai as sugary white, cream or yellow coloured balls soaked in Malai. It's often garnished with chopped nuts like pistachios or almonds. Rasmalai is a rich and creamy dessert enjoyed on special occasions and festivals. The shelf-life of the product at ambient temperature (25-30^{o}C) is only one day which can be increased to 3 to 5 days if kept in refrigerated storage. Today consumers are choosing food products that strengthen their immune systems and encourage good health because they are becoming more and more aware of the significance of diet for human health. Various food applications of pomegranates are highly delineated (Kandylis *et al.*, 2020).

On the other hand, these fruit peels are the cheapest raw materials and are a rich source of polyphenols and antioxidants. The pomegranate fruit peel extracts possess noteworthy antioxidant compounds such as tannins and flavonoids, which are responsible for exceptional wound healing, antibacterial and antiviral qualities (Saroj, R., et al.,2020).Since, fruit peel extract incorporated dairy product like Rasmalai is a new effort and there are very minimal studies like herbal rasmalai (Ambili *et al.,* 2023).Fresh peel powder was found to have a greater phenol concentration and antioxidant activity, despite having a higher nutritional content overall, with the exception of a few components.(Ranjitha *et al.,* 2018). Use of waste as a source of polyphenols and antioxidants may have considerable economic benefit to food processors and Pomegranate peel practical qualities are profoundly enhanced (Sandhya *et al.,* 2018) Therefore a cheap, efficient and environmentally sound utilization of these wastes is needed. Pomegranate is a rich source of a variety of phytochemicals, which are responsible for its strong antioxidative and anti-inflammatory potential **(**Vucic *et al.,* 2019). The current study was designed to develop Functional Rasmalai by incorporating pomegranate fruit peel powder.

MATERIALS AND METHODS

Raw buffalo milk was received from the local dairy farm. Vinegar was purchased from local market which was used for the preparation of chhana. Muslin cloth used for the preparation of chhana was

purchased from market. The pomegranate peel powder was prepared by drying in solar drier and grinding into fine powder. Sugar was purchased from the local market.

3. MANUFACTURING PROCESS OF POMEGRANATE PEEL POWDER INCORPORATED RASMALAI

The cow milk is heated to a temperature of 85-90°C under continuous stirring. After that cool the milk to a temperature of 70-75°C then add 30 ml vinegar under continuous stirring, stop adding vinegar when the milk completely breaks. The whey is drained off from the curd under muslin cloth and washed under running water to remove excess acid. The pomegranate peel powder was prepared by solar drying the peel and grinding into fine mesh powder. Then knead the chhana with the 2% pomegranate peel powder then prepare a flattened balls with the chhana. The flattened balls are cooked in a sugar syrup for 5-10 minutes and squeeze the flattened chhana balls and prepare the sweetened (5 to 6% sugar) milk thickened to one third of its volume. It is stored in an air tight container and stored under refrigeration conditions.

4. SENSORY EVALUATION

The sensory panellists (20 semi trained) were academic staff and students of the college of food and dairy Technology, koduveli. The panellist was instructed to assess the quality of the rasmalai basis of sensory attributes such as appearance, flavour, texture and overall acceptability using 9 point hedonic scale

4.1. Statistical Analysis

Three independent replications were performed for all the experiments. The results were expressed as mean ± standard deviation. The results obtained during the experiments were subjected to two-way analysis of variance (ANOVA) with a subsequent least significant difference (LSD) test for multiple sample comparison test procedure of the Statistical Package for Social Sciences (SPSS). The significance was tested at 5 % level of significance using mean values of various parameters. For computation of data, software application 29 programmes like Microsoft Excel and SPSS software (version 22.0.0.0) procured from IBM Corp. NY (USA).

4.2. Proximate Analysis

The Moisture, and ash contents (%) of Rasmalai were determined by AOAC (AOAC International, 2012) method. The fat content of Rasmalai was determined by the AOAC 21Edn 2016 chapter 32 922.06. Total nitrogen (%) of Rasmalai was estimated according to the IDF standard 20B (IDF, 1993). Further, protein contents (%) of Rasmalai were calculated by IS:7219: 1973. The Carbohydrate content was estimated by ALPL/FD/SOP/065.

RESULTS AND DISCUSSION

The results obtained from the various experiments conducted on the development of Rasmalai with pomegranate peel powder and to estimate the quality by sensory analysis, physicochemical analysis and antioxidant activity.

5.1. SENSORY ANALYSIS OF TREATED RASMALAI:

Table 1: Sensory Analysis data

SAMPLE	COLOUR AND APPEARANCE	FLAVOUR	TASTE	OVERALL ACCEPTABILITY
CONTROL	8.20 ± 0.70^{b}	8.00 ± 0.48^{b}	8.00 ± 0.87^{b}	8.11 ± 0.87^{b}
T_1	8.22 ± 0.66^{b}	7.90 ± 0.70^{b}	7.90 ± 0.70^{b}	7.90 ± 0.78^{b}
T_2	6.81 ± 0.75^{a}	6.72 ± 0.78^{a}	6.63 ± 0.67^{a}	6.45 ± 0.52^{a}
T_3	6.60 ± 0.69^{a}	6.50 ± 0.70^{a}	6.50 ± 0.70^{a}	6.40 ± 0.51^{a}
F value	168.37	133.59	152.11	186.48

Where,

T_1 -Rasmalai with 2% pomegranate peel powder
T_2 - Rasmalai with 4% pomegranate peel powder
T_3 - Rasmalai with 6% pomegranate peel powder.

The result of sensory analysis shows that treatment T_1 score have higher values than other treatment and it was comparable with control sample. Hence it was standardized as optimized treatment or ratio for preparation of Rasmalai incorporated with Pomegranate peel powder.

5.2. PROXIMATE ANALYSIS OF POMEGRANATE PEEL POWDER INCORPORATED RASMALAI:

Table 2: Proximate analysis data

Attributes	Control	Treated Rasmalai
Moisture	55.26±0.17	54.31±0.08
Total ash	3.34 ± 0.01	3.87 ± 0.03
Total fat	10.83 ± 0.29	10.92 ± 0.25
Protein	11.73 ± 0.25	12.32 ± 0.11
Energy	137.4 kcal	156.7 kcal

The data regarding proximate analysis in control and the optimised sample prepared using Pomegranate peel powder are represented in table 4.2. Data was statistically analysed for protein, fat, moisture, ash, energy and their mean values are tabulated.
(From table 2)It was found that the mean value of protein value of Treated Rasmalai (11.32 ± 0.11) is higher than the control rasmalai (10.73 ± 0.25), the moisture was found to be higher in control rasmalai (55.26 ± 0.17) than the treated rasmalai (54.31±0.08), the total ash was higher in the treated rasmalai (3.34 ± 0.02) than the control rasmalai (3.87 ± 0.03), the total fat was almost same in the control rasmalai (10.73 ± 0.29) and the treated rasmalai (10.92 ± 0.25),the energy value of the treated rasmalai (156.7 kcal) was higher than the control rasmalai (137.4 kcal)

CONCLUSION

The sensory analysis revealed that it has been good sensory attributes compared to the control rasmalai. Additionally, the proximate study indicates that the nutrients in the treated rasmalai have significantly increased. Further Study is required on the antioxidant activity of rasmalai incorporated with pomegranate peel powder.

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