



ISSN (E): 2277- 7695

ISSN (P): 2349-8242

NAAS Rating: 5.23

TPI 2021; 10(4): 182-184

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www.thepharmajournal.com

Received: 08-02-2021

Accepted: 15-03-2021

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Optimization of green peas Basundi

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Abstract

The present study entitled “Optimization of green peas Basundi” was carried out with objective to optimize the levels of green peas and sugar in Basundi. The levels of green peas paste and sugar were finalized on the basis of sensory evaluation. The levels selected for green peas paste were 10, 12.5, and 15 per cent and levels of sugars (15% and 20%). Treatment T₂ having 12.5 per cent green peas paste and 15 per cent sugar was most acceptable among other treatments in respect of sensory qualities and overall acceptability.

Keywords: Basundi, green peas, sensory analysis, fortification, emulsifier

Introduction

Milk is considered as a nature's almost perfect food. Milk is rich source of almost all essential nutrients in proper proportion for growth and development of human being. The traditional milk products are being made in India since time immemorial. These products have religious, social, cultural, nutritional, medicinal, and economical importance. The major portion of milk produced (about 50 per cent) is converted into traditional dairy products like heat desiccated milk products *viz.*, khoa, basundi, rabri etc., coagulated milk products *viz.*, dahi, shrikhand, paneer, chhana and chhana based products and clarified products *viz.* butter oil, ghee, etc. which are inherent in ancient traditions and have a strong social and cultural heritage in the Indian society. Among the different heat desiccated milk product basundi is a popular product of southern parts of India particularly in states of Andhra Pradesh, Gujarat, Karnataka, Maharashtra, Kerala and Tamil Nadu.

Basundi is a heat desiccated sweetened milk like rabri. The difference between these two is based on the texture. Rabri has very distinct hard flaky layer of clotted cream whereas basundi is generally homogenous or have very soft and fine flakes, which in fact are very fine heat coagulated protein particles. Basundi has sweetish cooked to caramelized flavour and its colour varies from white to slight brown (BIS, 1981) [2]. Now a days, the popularity and demand of Basundi is increasing due to its delicacy. Hence its production and marketing is increasing in a few big cities of the country. Recently organized sector has also been reported to enter the Basundi market. Since, Basundi is an emerging traditional milk delicacy in Indian market, considerable attention has been received by the researchers during last few years. Market survey was conducted in three cities of Gujarat (Patel and Upadhyay, 2001) [7] and one city of Karnataka i.e. in Bangalore (Dharaiya, 2006) [3] regarding chemical composition and organoleptic quality of Basundi sold by different halwais' shops and restaurants. Recently, a traditional method of Basundi making has standardized and an appropriate technology has been developed to obtain most desirable organoleptic and physico-chemical characteristics for Basundi (Pagote, 2004) [5]. The market value of Basundi depends upon a relative creamy consistency, white to light brown colour, sweetish caramel aroma and soft textured flakes uniformly distributed throughout the product mass. (Aneja 1992) [1].

In recent years, a lot of interest has been generated in the development of milk with vegetable, fruit and nuts based delicacies. Some of the milk product with vegetable and fruit based delicacies are very popular *viz.* Amrakhand, Santra burfi, Anjir burfi, Custard apple ice-cream, Banana milk shake etc. The Green Pea is leguminous crop originated from Afghanistan. The father of genetics G. J. Mendel worked on green pea (*Pisium sativum*). In India Green Peas mostly grown as leguminous vegetable crop used to prepare food dishes. Green Peas have great nutritional value therefore used to prepare most of Indian food dishes. 100 g of Green Pea contain 81 Kcal. Crude fiber 5.1 g, Protein 5.42 g, fat 0.40 g and carbohydrate 14.45 g. Green Pea contains less calories therefore important for fatty person to control weight.

It contains soluble and insoluble fiber, insoluble fiber helps in lowering blood cholesterol level. Soluble fiber guards against constipation, so reduces the risk of colon and rectum cancer. Legumes also accumulate natural products (secondary metabolites) such as isoflavonoids that are considered beneficial to human health through anticancer. Hence it is decided to add green peas in Basundi as a functional ingredient. The study aims at developing simple technology for better utilization of Green Peas paste in basundi at domestic level.

Materials and Methods

Materials

Fresh cow milk sample was procured from Research Cum Development Programme on cattle, MPKV, Rahuri, District-Ahmednagar, Weighing Balance of Electronic precision balance (BT 2245, Sartorius ISO 9001) for weighing samples, ingredients and chemical etc, An iron karahi having 40 cm depth with capacity to hold four litre of milk. Refrigerator to keep samples at 7 ± 2 °C for cooling, "Bajaj FX 10" food processor for grinding the samples, Long handled stirrer with flattened end made up of mild steel for stirring was used during preparation of basundi, Sugar required as sweetening agent was purchased from local market, Fresh, good quality peas were procured from local market.

Methodology

Selection of levels of green peas paste and sugar

Different lots of basundi were prepared in the laboratory as per the procedure, given by Patel and Upadhyay (2003) [6] with slight modifications using different levels of the green peas and sugar levels.

In the pre-experimental trials four levels of green peas paste (10%, 12.5%, 15% and 20%) and three levels of sugar (15%, 20%, and 25%) were tried. Thus total of 12 combinations were tried twice and also subjected to sensory evaluation by semi-trained judges using the 9 point hedonic scale. Thus, total of 12 combinations were prepared, out of which three levels of green peas paste (10%, 12.5% and 15%) and two levels of sugar (15% and 20%) selected on the basis of high scores in sensory evaluation.

Preparation of green peas paste

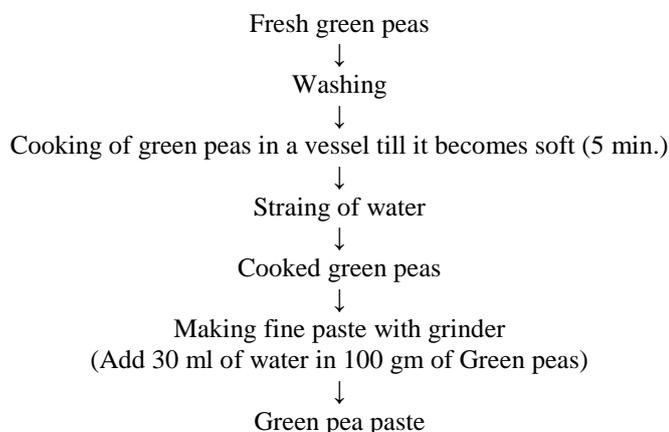


Fig 1: Flow Diagram for Preparation of green peas paste

Preparation of green peas fortified basundi

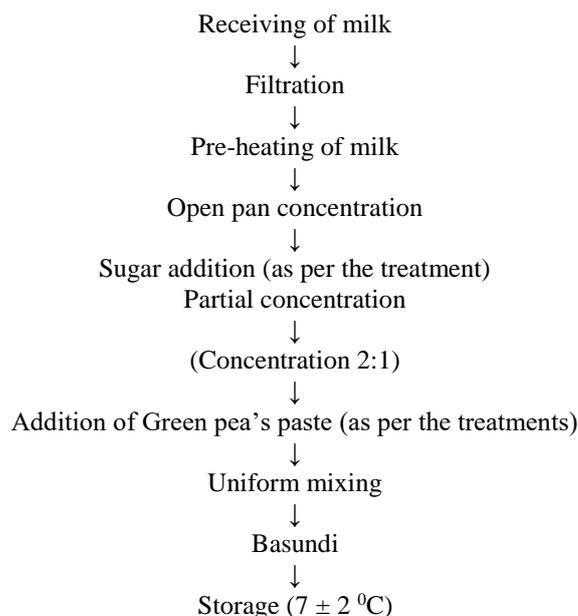


Fig 2: Flow Diagram for Preparation of green peas fortified basundi

Sensory evaluation

Sensory evaluation of green peas fortified basundi samples was carried out by using 9- point hedonic scale described by Gupta (1976) [4]. The product was evaluated for sensory attributes by the panel of 5 semi trained judges.

Treatment combination

T ₀	Control
T ₁	10 % green peas paste + 15 % sugar
T ₂	12.5 % green peas paste + 15 % sugar
T ₃	15 % green peas paste + 15 % sugar
T ₄	10 % green peas paste + 20 % sugar
T ₅	12.5 % green peas paste + 20 % sugar
T ₆	15 % green peas paste + 20 % sugar

Results and discussion

Flavour

The flavour is the combined effect of taste and smell. It was found the significant difference for flavour of green peas fortified basundi. The highest score (8.3) was obtained by the treatment T₂. As level of green peas paste increases the smell of cooked green peas becomes denser. So lower score were noted in samples (T₃ and T₆) contained high green peas paste level. The highest score for T₂ was might be due to the balanced effect of smell and taste over other combinations.

Colour and appearance

It was observed that the colour and appearance of all the samples prepared under different treatments had uniform, attractive, pleasant and shiny appearance with light greenish colour and brilliant feel without dullness. The green peas fortified basundi sample T₂ (8.4) was superior over the other samples. The sample T₆ had lowest average score (7.0) for the colour and appearance because of slight dull greenish colour feels due to increased concentration of green peas paste.

Consistency

It has been observed that the samples consistency going to thicker and paste like as per the percentage of green peas increases thus the lowest sensory score rated by the judges to sample T₆ (7.0). The most acceptable consistence of sample T₂ (8.8) selected by the judges due to the balanced effect of green peas on basundi.

Overall acceptability

It was observed that the basundi sample T₂ showed highest (8.6) overall acceptability than other samples. The sample T₆ showed lowest (7.1) average score for overall acceptability of basundi samples. As level of green peas paste goes on increasing, it reduces the sensory score for flavour, consistency, taste which ultimately resulted in the reduction in score of overall acceptability. The high score might be due to perfect combination of level of green peas paste and sugar which results in to good combination of flavour, colour and appearance and desired consistency.

Table 1: Sensory qualities of green peas fortified basundi

Treatments	Flavour	Colour and appearance	Consistency	Overall acceptability
T ₀	8.0	8	8.3	8.1
T ₁	6.9	7.3	7.5	7.3
T ₂	8.3	8.4	8.8	8.6
T ₃	6.7	7.1	7.3	7.3
T ₄	7.4	7.5	7.5	7.6
T ₅	7.5	7.6	7.6	7.8
T ₆	6.5	7.0	7.0	7.1
Mean	7.3	7.5	7.7	7.6
S.E.±	0.140	0.115	0.227	0.166
CD @ 5%	0.425	0.350	0.688	0.505

Conclusion

It has been concluded that the green peas fortified basundi might be prepared by using three levels (10%, 12.5 % and 15%) of green peas paste and two levels (15% and 20%) of sugar. The best quality *basundi* sample can be prepared by incorporation of 12.5 per cent green peas paste and 15 percent sugar.

Acknowledgment

The authors are thankful to department of animal husbandry and dairy science, PGI, MPKV, Rahuri for their support all though.

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