

PROCESSING AND DEVELOPMENT OF MUSKMELON ICE-CREAM INCORPORATED WITH GONDKATIRA

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ABSTRACT

Frozen dessert is delicious in the warmer months because it is chilled and flavorful. Muskmelon puree was incorporated into a base mixture complemented by vanilla extract for added flavor complexity. Gondkatira is a natural resin which is also known as tragacanth. Gondkatira, acts as a natural body coolant, laxative, and cures constipation. When it is included in the ice-cream it serves as a natural stabilizer and enhances the consistency of the ice cream. It is a great source of calcium, dietary fibre, and natural prebiotic. Muskmelon, is a seasonal fruit for summer that helps in keeping the body cool and hydrated, it ensures a good supply of vital vitamins and minerals such as vitamin C, iron, vitamin B6, magnesium, cobalamin. Cantaloupe is prepared with sugar to pull moisture into it. Gondkatira is pulverized and blended with the cream and milk using a homogenizer. Prepared muskmelon pulp is incorporated into the cream mixture before it is frozen. Three different formulations will be created with changes in combinations of gondkatira and muskmelon. The goal of this innovation is to develop a nutritious and functional food product that offers a range of health benefits.

INTRODUCTION

Gum tragacanth possesses gels and mucus-forming characteristics. Gond katira contains pentose, hexose, rhamnose, arabinose, and galacturonic acid and has stabilization characteristics, thickening, moisture control, emulsification and filling properties. Polysaccharides are widely utilized in the formulation of food items, thanks to their extensive versatility (Meghwal.M, et.al, 2017). Katira is an organic botanical resin acquired from the stem bark of *Cochlospermum religiosum* (Patrakar Ramling,et.al., 2021). The plant secretes resin from deeply grooved bark when exposed to physical harm, pressure, or fungal invasion (Izydorzcyk,2005). The gum consists of D-galactose, L-rhamnose, and D-galacturonic acid in a molar ratio of 3:2:1 with minimal quantities of ketohexose (Hirst,1953). Katira and its offspring demonstrate distinct qualities, such as elevated levels of expansion in water, considerable thickness, exceptional flow attributes, and elevated water holding capacity (Sharma, 2013). Crucially, gum tragacanth is secure, harmless, and non-reactive (Karan,et.al.,2019). Cantaloupes from the Cucurbitaceae clan have been familiar to humans since ancient times and are plants of both financial and dietary significance. Biological activities observed in muskmelon consist of antioxidant, anti-inflammatory, pain-relieving, antiglycation, anti-hyperlipidemia, and antidiabetic effects, along with the suppression of growth of specific cancer cells (Shivapriya Manchali et.al.,2020). Muskmelon (*Cucumis melo L.*) is one of the economically significant fruit in the world and the crucial quality determining factors of it are sugars and antioxidants. In the current research, such as phenolics, flavonoids, vitamin C, pigments, overall antioxidant capacity as well as compounds associated with sweetness such as reducing, non-reducing and total sugars, starch and functions of different enzymes linked to these biochemical constituents were assessed in muskmelon during its successive phases of growth and maturation. Although the levels of sugars and phenolics rose as ripening advanced, other antioxidants such as vitamin C, carotenoids have also increased. In recent years, there has been a greater acknowledgment of muskmelon's potential beyond its customary applications. Food researchers and dieticians are investigating creative methods to incorporate cantaloupe into processed foods and beverages, leveraging its health advantages and alluring sensory characteristics. One remarkable use garnering interest is its incorporation in frozen treats, like ice cream, where its taste and consistency can improve product attractiveness and wellness benefits. (Menon.S.V,et.al.,2012) . Cantaloupe sorbet combines

the velvety, smooth consistency of milk with the fruity aroma of cantaloupe, resulting in a sensory journey that pleases both the taste buds and the perceptions. This icy delight not only embodies the spirit of summertime with its chilly, invigorating flavor but also offers a healthy kick with honeydew melon's vitamins (A and C), minerals (potassium), and dietary fibre. The addition of honeydew melon to ice cream not only elevates its taste but also brings in distinctive mouth feel components, creating an enticing option for customers looking for both indulgence and nutritional benefits in their sweets. Innovation mirrors continuous patterns in the food sector towards organic components, health-conscious alternatives, and unique flavor mixtures that cater to contemporary palates.

MATERIALS AND METHODS:

Raw materials:

Fresh muskmelon, sugar, cream, milk, gondkatira powder, milk powder.

Methods:

Preparation of muskmelon pulp:

Select ripen muskmelons, as they will have the best flavor and sweetness. Cut the muskmelon flesh into chunks and remove the seeds and peel followed by further cutting of chunks into small cubes to ensure perfect blending. Transfer the muskmelon cubes into a blender or food processor. Blend until reaches a smooth consistency. Strain the blended muskmelon through a fine mesh sieve (Rajan Singh et al., 2018). Collect the smooth muskmelon pulp.

Preparation of gond katira powder:

Gond katira gum was crushed into small pieces to ensure fine blending. Pieces of gond katira gum was transferred into blender and blend until fine consistency (Fakir Mohan Sahu 2017), collect the gondkatira powder

Preparation of Muskmelon icecream incorporated with Gond katira:

Ingredients were selected and weighed accurately followed by blending to prepare a mix. Mix was pasteurized at 68°C -70°C for 30 minutes. In next step mix was homogenized at 2500psi in first stage and at 500psi in second stage followed by cooling and ageing of mix at 0°C -4°C for 8 hours. Muskmelon pulp and Gond katira powder were added to the mix and subjected to freezing at -4°C to -18°C for 4-5 hrs. (Ankush Verma et al., 2018).

Three different variations of ice creams were formulated by changing the compositions of muskmelon pulp and gond katira gum which were expressed in table no. 1 and sensorial analysis was performed to the formulated variations.

Table no. 1: Different variations of ice-creams

INGREDIENTS	VARIATION-1	VARIATION-2	VARIATION-3
Muskmelon pulp	20gms	15gms	10gms
Gond katira powder	2gms	4gms	6gms
Cream	35gms	35gms	35gms
Milk	500ml	500ml	500ml
Sugar	45gms	45gms	45gms
Flavorings	0.5ml	0.5ml	0.5ml

SENSORIAL ANALYSIS:

Developed formulations were subjected to sensorial analysis along with control on nine point hedonic scale (Table no. 2) from different panellists by including sensory attributes like colour, taste, flavor, appearance and overall acceptability (Mohd Nayeem Ali et al 2016). By considering mean score of sensory analysis Optimized product was selected for further analysis which includes physico-chemical analysis.

Table no.2: Nine point hedonic scale

Score	Grade
9	Like extremely
8	Like very much
7	Like moderately
6	Like slightly
5	Neither like nor dislike
4	Dislike slightly
3	Dislike moderately
2	Dislike very much
1	Dislike extremely

Physico-chemical Analysis:

Formulation which scored highest overall acceptability was subjected to physico-chemical analysis along with control and tests include moisture, fat, pH by using pH, protein, fibre, carbohydrates and over run (Ting-Jang Lu et al., 2002).

Sensory attributes	Control	Variation-1	Variation-2	Variation-3
Colour	9	9	8	7
Taste	9	9	8	7
Appearance	9	9	9	8
Flavor	9	8	8	7
Texture	9	8.5	8	7
Overall acceptability	9	9	8	7

Table no.3: Sensorial analysis of developed formulations along with control:

Moisture: Moisture content of the ice cream was calculated by using FSSAI Laboratory Manual.

Carbohydrate: Carbohydrate was estimated by (Lane and Eynons method).

Protein: Protein content was determined by Kjeldahl method as per (Pearson’s Composition and Analysis of Foods, 9th edn 1991.)

Fat: Fat content of the Ice Cream was calculated By Gerber method (FSSAI Laboratory Manual 2016)

Acidity: Acidity was determined by using FSSAI Laboratory Manual 1.

Overrun: Overrun were calculated by the method given in (Sommer 1951).

pH : pH was determined with the help of digital pH meter

RESULTS AND DISCUSSION:

Sensorial analysis:

According to the results of sensorial evaluation of formulated variations along with control, the muskmelon ice cream formulation which consists of 500ml of milk, 20g of muskmelon pulp, 2g of gondkatira gum (trial 1) demonstrated a higher mean rank for the five attributes, in particular, colour and appearance, taste, flavour, texture and overall acceptability from sensory evaluation. Overall acceptability score of variation-1 was nearer to the control. Hence formulation-1 was considered as optimized product and subjected to further analysis. Results of sensorial analysis were shown in table no. 3

Results of physico-chemical analysis were expressed in the table no. 4

S.no	Parameters	Control	Optimized variation
1	Moisture%	63.84	63.27
2	Fat%	9.77	10.22
3	Acidity%	0.32	0.27
4	pH	6.23	6.17
5	Fiber	0.7gms	18
6	Protein	3.5gms	6.32
7	Carbohydrates	36.78	36.65
8	Over run	31.65	28.09

Table no.4: Physico-chemical analysis:

Compared to the conventional dairy ice cream, these study findings indicates that there were some similitudes in the outcomes for physicochemical properties of muskmelon ice cream.

The moisture content affects the texture and creaminess of ice cream. Moisture content of both ice creams was similar. Moisture basically comes to the ice cream by milk and maintained through the freezing process. Since the same freezing conditions were used, moisture content of both ice creams was similar. The recommended moisture content for ice cream is 60% to 75% and muskmelon ice cream contained moisture around the recommended value of 63%. The value suggests that it maintains sufficient moisture for a smooth and creamy consistency, which greatly influences the whole sensory experience.

The fat content of ice cream greatly influences its texture, creaminess and overall mouth feel. The muskmelon ice cream and traditional dairy ice cream contain fat content of 9.7% and 10.22%, respectively. This property indicates that both ice creams have similar fat contents. In muskmelon ice cream formulation, cream plays a role as the major fat source.

The pH value indicates the level of acidity and alkalinity of the product. Ice creams usually have slightly acidic to neutral pH, which contributes to the overall flavour and stability to the product. The formulation which was mostly liked by the panel members closely matches the control’s pH i.e,6.1, implying that its acidity level is in line with the conventional ice cream, for a balanced taste. The titrable acidity of dairy ice cream expressed as lactic acid. The overrun of muskmelon ice cream was indicated as 28%, and it falls within the recommended range. The overrun of ice cream is affected by the fat source and fat content. As observed, there was a slight significance difference between muskmelon ice cream incorporated with gondkatira and traditional ice cream. It indicates that it achieves a similar level of airiness, which is vital for pleasant mouth feel.

According to the results, protein content of both ice creams was slightly variable. As the novel product formulations contains plant based products rather than chemicals ad artificial additives. The carbohydrate content of ice cream plays a vital role in its nutritional composition and its impact on dietary preferences. The CHO content in muskmelon ice cream and the conventional dairy ice cream has a significant difference. The

carbohydrate content is comparatively high in the muskmelon ice cream formulated than traditional dairy ice cream. The higher carbohydrate content due to the addition of natural sugars than takes centre stage differing from the conventional ice cream. From all the above results and the comparative study of formulated muskmelon ice cream incorporated with gondkatira with the conventional ice cream showcases that the formulated

ice cream aligns the goal of creating an alternative that can effectively replace the traditional dairy ice cream. The study illustrates the potential of formulated muskmelon ice cream to emerge as a health-conscious alternative to the established conventional ice cream.

The results physico-chemical analysis of my study coincides with the study conducted by (Hesham A. Ismail et al, 2020).

CONCLUSION

Ice cream is a universally beloved dessert, known for its versatility in flavors and ingredients. Incorporating gondkatira into muskmelon ice-cream improved products textural, nutritional and sensory qualities. This combination not only enhances ice-cream stability and shelf life but also makes it a healthier dessert option which was rich source of protein and fiber. The overall result is high quality ice-cream that retains the delightful taste of muskmelon while benefiting from the functional properties of gondkatira

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