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Development of A nutraceutical product using Benincasa hispida

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ABSTRACT

Benincasa hispida of family Cucurbitaceae was also known as Kushmanda, Winter melon, or Wax gourd is used in Ayurvedic system of medicine. It is cultivated throughout the plains of India and on the hills up to 1200 meters altitude as a vegetable. The fruit of Winter melon is considered as a diuretic, aphrodisiac, Appetizer. It is used against acidity. Gulkand, prepared using rose petals, is a medicinal formulation which has been valued for centuries in Ayurvedic medicine is also rich in calcium and antioxidant properties. It has been traditionally used as a cooling tonic. The aim of the study was to develop a fortified Nutraceutical product using *Benincasa hispida* and Gulkand with added health benefits, its sensory evaluation and phytochemical analysis.

Keywords— *Benincasa hispida*, Gulkand, Product development, Sensory evaluation, DPPH, Antacid

1. INTRODUCTION

Benincasa hispida is an extensive trailing or climbing annual herb cultivated throughout the plains of India and on the hills up to 1200 m altitude, as a vegetable. All parts of the plant contain rough hair. By maturity, the fruit loses its hairs and develops a waxy coating, giving rise to the name wax gourd, and providing a long shelf life^[1].

Benincasa hispida is commonly known as kolu or safed kolu (Gujarati), Petha (Hindi), white pumpkin/ wax gourd/ ash gourd/ winter melon (English), Kushmanda (Sanskrit) and Kohla (Marathi). The fruit is a large fleshy pepo. It consists of a thin skin of epidermis, fleshy and juicy mesocarp and swollen, thick placenta. The fruit is tricarpeal, syncarpous with peripheral placentation. Fruits of this plant are traditionally used to treat renal diseases, jaundice, dyspepsia, fever and menstrual disorders^[7]. The methanol extract of the fruit is reported to possess anti-ulcer^[3], anti-inflammatory^[4], antihistaminic, and antidepressant activities^[5]. Fruits of *Benincasa hispida* are traditionally used for the treatment of epilepsy and other nervous diseases.^[6]

Winter melon contains nearly 96% water and is really a dietitian's delight^[9]. It is also high in calcium. It is alkaline in nature and therefore features a cooling as well as neutralizing effect on stomach acids and therefore utilized efficiently for the treatment of digestive conditions just like hyperacidity, dyspepsia, and ulcers^[3].

The fruit juice is also effective in cases of mercury poisoning and snakebites. It can even treat mouth cancer, protecting teeth and gums when a mouth gargle of the juice is done regularly. It is also effective in bleeding of gums^[10].

Gulkand is an Ayurvedic tonic. It helps in reduction of pitta and heat in the body, in the reduction of eye inflammation and redness, strengthening of the teeth and gums, and in the treatment of acidity. Gulkand has a cooling property. It helps to relieve tiredness, lethargy, itching, aches and pains. It also helps in reducing burning sensations in the soles and palms. Gulkand is a powerful antioxidant and a very good rejuvenator^[10].

2. MATERIALS AND METHODS

The fresh fruit of Winter melon and fresh Rose petals were collected from the local fruit, flower and vegetable market of Dadar, Mumbai.

The fruits were peeled, dried; grated and seeds were removed. The rose petals were dried and then used. The layers of rose petals, sugar and grated Winter melon were arranged alternatively in the glass jar. Dry ingredients like cloves and cardamom in the form of powder were added and mixed well. Drying was carried out by putting the glass jar in the oven for 15 – 20 days at 42 to 45° C.

The ingredients were mixed in the jar every alternate day using a wooden spatula. The product takes nearly 20 days for its proper mixing of the ingredient. After sugar is melt completely, a brownish red color is seen which indicates the gulkand is ready.

The final product was then subjected to various tests and stability study was done for the same.

Standard marketed antacid and gulkand were purchased from the chemist. All other chemicals used were of analytical grade. UV absorbance was recorded using Varian UV- Visible spectrophotometer.

2.1 Chemical analysis

The protein, fat, carbohydrate, crude fibre, vitamin C, calcium, ash, moisture content and acid insoluble ash of the product were determined using standard methods. [15,16,17,18,19,20,22].

2.2 Storage study

Further to evaluate the keeping quality and durability of the product, subsample were stored for 0 days, 7days, 14 days, and 21 days for 6months at room temperature. These subsamples were tested for sensory evaluation and microbiological analysis.

2.3 Microbiological Analysis

Microbiological profile w.r.t. total plate count (TPC) was done.

2.4 Phytochemical test

Phytochemical examinations were carried out for the final product to check various constituents present in the product.

2.5 Sensory analysis

The sensory analysis of the products was done for the color, aroma, taste, texture and overall acceptability against the standard marketed product.

2.6 Antioxidant activity

The DPPH assay of the product was carried out to determine the antioxidant activity present in the product [13].

2.7 Antacid property

The antacid property of the product was determined by titrimetric method against the standard marketed tablet.

3. OBSERVATIONS AND RESULTS

In the present study, the developed product was tested for various parameters such as chemical composition, organoleptic properties and keeping quality and the results are discussed.

3.1 Chemical analysis

The results of the chemical composition of the various constituent present in the sample are presented in table 1. The ash content and the moisture content results are presented in table 2.

3.2 Microbiological analysis

The total plate counts for the product were done at various dilutions and the results obtained are displayed in table 3.

3.3 Phytochemical test

The phytochemical screening of the product showed positive results for carbohydrates, flavonoids, saponins, terpenes, tannins and glycosides and the results are shown in table 4.

3.4 Sensory analysis

The organoleptic analysis for the product as done along with the marketed product as a control. It was conducted amongst 50 participants and the results obtained are depicted in table 5.

3.5 Antioxidant activity (Vitamin c in as guard 1mg/100g) & 30mg/100g calcium

The antioxidant activity of the product was compared with standard ascorbic acid by DPPH assay. The result showed that the IC₅₀ value of the product was found to be 70 (µg/ml) and that of the standard was 51 (µg/ml). The results are shown in table 6 and graph 1.

3.6 Antacid property

The Antacid property of the product was found to be more than the marketed Gulkand but was less than that of the standard antacid tablet. The result is displayed in table 7.

4. DISCUSSION

Gulkand is well known for its cooling properties and as a powerful antioxidant and rejuvenator.

It has been well reported that gulkand consists of various active and major phytochemicals which act synergistically and responsible for the therapeutic activity of the product. [3][10]

Gulkand prepared using *Benincasa hispida* base is observed to be rich in Vitamin C and Calcium with antacid and antioxidant property.

It was found that content of Vitamin C, which is the potent antioxidant, in winter melon gulkand was more as compared to marketed Gulkand hence it has more antioxidant property than market gulkand.

Winter melon Gulkand showed higher content of Calcium which the market gulkand does not have. Amount of Calcium present in this product is 26.05mg in 100mg.

It was observed that fruit of *Benincasa hispida* is bland in taste and it can be easily incorporated in the traditional gulkand after which the taste has not been compromised. It was well supported by the results of the sensory evaluation.

During the process of making winter melon gulkand it was observed that the water content of winter melon created a hindrance. The juice also contains the nutritive components of the winter melon hence tapping this nutrient content to increase the nutritional value of the augmented gulkand is necessary, for which lyophilization of the winter melon juice is in progress.

5. CONCLUSION

- In the present study, a new product was developed successfully and was found to be rich in calcium. Sensory analysis showed it was more acceptability than the marketed product.
- From the present study, it can be inferred that the fortified gulkand can have more nutritive and therapeutic potential than marketed gulkand.

6. FUTURE SCOPE

- Antacid and antioxidant property can be evaluated by conducting clinical trials
- The Serving size can be estimated.
- The newly augmented gulkand can be made more acceptable by adding flavours, attractive packaging and making it in a form of a confectionary any item.
- Nutritional content of the product can be increased by finding a method to avoid the wastage of winter melon juice by freeze-drying of the juice and incorporate into the product.

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