WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 14, Issue 11, 2114-2121. Research Article ISSN 2277–7105

FORMULATION AND EVALUATION OF BEETROOT CANDY

Vikas Kumar[1], Kuljeet Kaur[2*] and Dr. Manjul Pratap Singh[3]

[1]Vishveshwarya College of Pharmacy,

[*2,3]Vishveshwarya Group of Institutions, Greater Noida, G.B. Nagar, Uttar Pradesh, India.

Article Received on
23 April 2025

Revised on 11 May 2025
Accepted on 31 May 2025

DOI: 10.20959/wjpr202511-37041

***Corresponding Author**
Kuljeet Kaur
Vishveshwarya Group of Institutions, Greater Noida, G.B. Nagar, Uttar Pradesh, India.

ABSTRACT

The present study focuses on the formulation and evaluation of beetroot-based candies using *Beta vulgaris* (commonly known as beetroot), a rich source of bioactive compounds including betalains, phenolic compounds, dietary fiber, and essential minerals. Despite its numerous health benefits—such as antioxidant, antitumor, hepatoprotective, and cardiovascular-supportive properties—beetroot is often disliked due to its earthy taste. To enhance its acceptability, especially among children, beetroot was processed into candy form using simple household techniques and natural additives like lemon and cardamom. Two formulations were prepared and evaluated based on organoleptic properties, aftertaste, pH, moisture content, and stability tests under different temperature conditions. The formulation F1 showed better texture and acceptability compared to F2. The study concludes that beetroot candy not only preserves the nutritional benefits of beetroot but also improves its palatability and convenience, making it a viable functional food product.

KEYWORDS: Beta vulgaris, beetroot, candy, nutrition, children.

INTRODUCTION

Beta vulgaris, commonly known as beetroot in English and Chukandar in Hindi (Figure 1), belongs to the Amaranthaceae family. This plant is a rich source of various bioactive compounds, particularly betalains, which include red-violet betacyanins and yellow-orange betaxanthins. In addition to betalains, beetroot contains other phenolic compounds such as small quantities of gallic, syringic, and caffeic acids, along with flavonoids. The red beetroot (*Beta vulgaris* L.) is also notable for its high content of dietary nitrate (NO_3^-), betanin, antioxidants, dietary fiber, and a wide range of minerals including potassium, sodium, iron,

copper, magnesium, calcium, phosphorus, and zinc. It also provides essential vitamins such as retinol, ascorbic acid (vitamin C), and B-complex vitamins.[1,3]

Figure 1: Beetroot.

Therapeutic uses of Beetroot[2,4,5]

Beetroot exhibits a wide range of biological activities, including antioxidant, antitumor, hepatoprotective (liver-protecting), nephroprotective (kidney-protecting), and cognitive-enhancing effects.[4]

- Traditionally, beetroot has been used to support liver health, as it is believed to aid in stimulating the liver's natural detoxification processes.
- Epidemiological studies indicate that dietary nitrate (NO_3^-)—abundantly found in beetroot— serves as a physiological precursor to nitric oxide (NO), a molecule that promotes vasodilation, supports cardiovascular health, and helps lower blood pressure.
- The antioxidant properties of beetroot are largely attributed to the presence of betalain, a nitrogen-containing pigment with strong free-radical scavenging ability.
- Beetroot also possesses antimicrobial and antiviral properties, further contributing to its therapeutic potential.
- Research has shown that beetroot extracts can inhibit the proliferation of human tumor cells, suggesting its potential role in cancer prevention or therapy.
- As a natural energy booster, beetroot stands out due to its high nitrate and sugar content, making it an excellent dietary supplement for enhancing stamina and overall vitality.

Why preparation of beetroot candy?

- Despite its nutritional value, many people refuse to consume it because of its earthy and unpleasant flavor. Thus, beetroots in candy form can increase the sensory acceptability, resulting in consumption of beetroot by both children and adults.
- Candies are practical to carry anywhere because of its small size, and beetroot candy would help avoiding spilling of beetroot juice and staining clothes.

MATERIALS AND METHODS

Materials

Fresh, mature and good quality beetroots, lemon, cardamom and sugar (Figure 2), were procured from local market of Dadri, GautamBudh Nagar, Uttar Pradesh. Simple processing treatment grinding, straining and boiling were used for pre-preparation of beetroot candy.

Figure 2: Material used for the preparation of beetroot candies (Sugar, beetroot, lemon and cardamom).

Methodology (also shown in Figure 3)

Two formulations were prepared using ingredients mentioned in Table 1. Procedure has been shown in Figure 3 (a-h), and in flowchart mentioned below

Fresh beetroot (procured from market)

⬇

Washing and scraping off the outer thin layer and then cutting into uniform size

⬇

Grinding of beetroot

⬇

Poured into muslin cloth and strained it

⬇

Added sugar in beetroot juice

⬇

Mixture transferred in thick layer Pan and slowly stirring in low flame (till it attained thick consistency)

⬇

Mixture taken off from flame

⬇

Added a few drops of lemon & a pinch of cardamom powder

↓

Poured mixture into mold (before it cools down) & kept for 24 hours

Table 1. Formulation, ingredients and their properties.

S.No	Ingredients	Properties	F1	F2
1.	Beetroot	Antioxidant, antitumor, antiinflammatory	25 gm	50 gm
2.	Sugar	Sweetning agent	25 gm	25 gm
3.	Lemon	Preservative/taste enhancer	qs	qs
4.	Cardmom	Flavouring agent	5 gm	5 gm

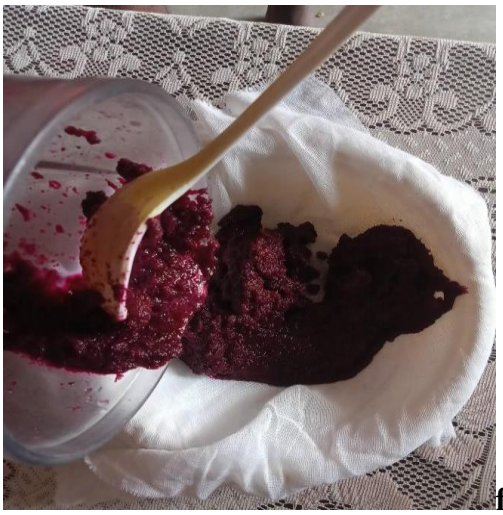
a)

b)

c

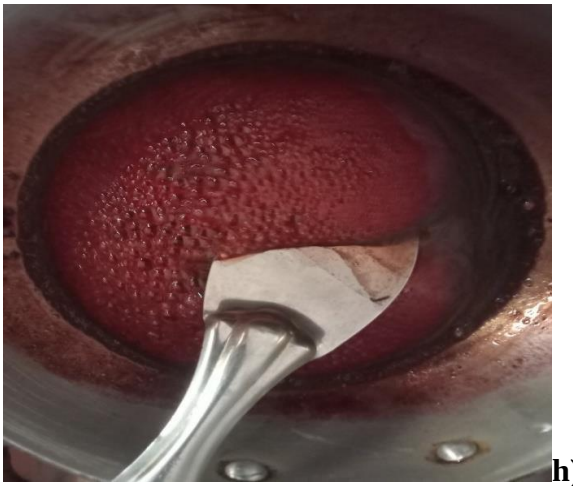
d)

e)



f)

g)



h)

Figure 3(a-h): Procedure of making beetroot candies.

Evaluation parameters[6,8]

Evaluation of the beetroot candies was done as given below

a). Organoleptic evaluation

- Color examination: The candies were placed on a watch glass and viewed with the naked eye under white light against a white background.
- Odour examination: Five different volunteers smelled the finished candies every 5 times. The time interval between sniffing was kept at 5 min to negate the effect of previous fractions and results were recorded individually.
- Taste & flavour examination: A taste and flavor examination was performed on 5 volunteers. A final piece of candy was given to each volunteer to examine the taste buds on the tongue.
- Texture examination: Texture was examined by 5 volunteers and the report was documented.

b) Moisture content

5 g of sample was subjected to oven drying at 50°C for 20 minutes. It was repeated after weighing it until a constant weight was obtained. The resultant loss in weight was calculated as moisture content.

Moisture% = Initial weight- Final weight/ Weight of sample × 100

c) PH Measurement

Candies were placed in a 100 ml flask containing 100 ml of distilled water and sonicated for about 15 minutes, then the pH was measured using a digital pH meter.

d) Stability testing

A physical stability test of the beetroot candy was conducted at various temperature conditions such as 2°C, 25°C and 37°C for 4 weeks.

OBSERVATION AND RESULT

Candies (F1) were prepared in various shapes to appeal children visual senses (as shown in Figure 4) and all the evaluation parameters are reported below.

Figure 4. Final candy (Formulation 1).

Organoleptic evaluation: (shown in Table 2).

Table 2: Result of organoleptic evaluation for both the formulations.

S.No	Parameters	F1	F2
1.	Color	Magenta	Magenta
2.	Odor	Characteristic	Characteristic
3.	Taste &flavor	Sweet & tangy	Sweet & tangy
4.	Texture	Hard & smooth	Very soft(did not conform hardness), thus discarded
5.	Aftertaste	Sweet	Sweet

a) Moisture content: Moisture content was not more than 2%

b) PH : Slightly acidic (5.5)

c) Stability: F1 was found to be stable for 4 weeks under varying temperature conditions as shown in table 3.

Table 3: Report of stability parameters for 4 weeks.

Temp. (hrs)	Temp.	Colour	Odour	Taste	Texture	PH	Stability
1 week	2°C	No change	No change	No change	No change	No change	Stable
	25°C	No change	No change	No change	No change	No change	Stable
	37°C	No change	No change	No change	No change	No change	Stable
2 week	2°C	No change	No change	No change	No change	No change	Stable
	25°C	No change	No change	No change	No change	No change	Stable
	37°C	No change	No change	No change	No change	No change	Stable
3 week	2°C	No change	No change	No change	No change	No change	Stable
	25°C	No change	No change	No change	No change	No change	Stable
	37°C	No change	No change	No change	No change	No change	Stable
4 week	2°C	No change	No change	No change	No change	No change	Stable
	25°C	No change	No change	No change	No change	No change	Stable
	37°C	No change	No change	No change	No change	No change	Stable

CONCLUSION

Beetroots have been associated with numerous health benefits, however due to its earthy taste, children do not like to consume it. We have prepared the candies with the aim of improving its sensory acceptance among children, and the adults as well, so that the high nutritious values of this vegetable can be available to all, at all the time, in their pockets and bags. The formulation was evaluated for various parameters and found to be acceptable to the volunteers and was stable for 4 weeks at different conditions.

ACKNOWLEDGEMENT

The first author of this study expresses the heartfelt gratitude to all those who supported him throughout this project; his guide, his Principal, and all the faculties of VCP & VGI whose insightful lectures and suggestions greatly contributed to the development of this work. The appreciation also goes to the classmates and friends who participated in the evaluation process and provided honest feedback. I am thankful to my family for their constant motivation, patience, and moral support throughout this endeavor.

REFERENCES

1. Barbu V, Cotârleț M, Bolea CA, Cantaragiu A, Andronoiu DG, Bahrim GE, Enachi E. Three Types of Beetroot Products Enriched with Lactic Acid Bacteria. Foods, 2020 Jun 14; 9(6): 786. doi: 10.3390/foods9060786. PMID: 32545898; PMCID: PMC7353617.
2. Baião DDS, Silva DVTD, Paschoalin VMF. Beetroot, a Remarkable Vegetable: Its Nitrate and Phytochemical Contents Can be Adjusted in Novel Formulations to Benefit Health and Support Cardiovascular Disease Therapies. Antioxidants (Basel), 2020 Oct 8; 9(10): 960. doi: 10.3390/antiox9100960. PMID: 33049969; PMCID: PMC7600128.
3. Bhattarai S, Kusma R. Preparation and quality evaluation of sugar and honey based beetroot candies. Sustainability in Food and Agriculture SFNA, 2022; 3(1): 15-18.
4. Chen L, Zhu Y, Hu Z. Beetroot as a functional food with huge health benefits: Antioxidant, antitumor, physical function, and chronic metabolomics activity Food Sci Nutr., 2021; 9: 6406–6420.
5. Chauhan, Kartik Chamoli and Shilpa Sharma. Beetroot- A review paper. J Pharmacogn Phytochem, 2020; 9(2S): 424-427.
6. Choudhary et al. Optimization of a New Formulation for Making Candyfrom Beetroot Curr. Agri. Res., 2024; 12(3): 1402-1414.
7. Lohagaonkar et al. Formulation and In vitro evaluation of Polyherbal Candy based on Indian medicinal plants for the treatment of cough and theirstability studies. Bull. Env. Pharmacol. Life Sci., April 2023; 12(5): 155-159.
8. Syarifah Mauliza, Gabena Indrayani Dalimunthe. Formulation And Evaluation Of The Preparation Of Hard Candy Source Of Sweet Orange (Citrus Sinensis (L.) Osbeck) As A Nutracetical. International Journal of Science, Technology & Management. 1465-1472.