

Development of Beetroot Laddu Enriched with Dry Fruits for Human Health and Diet

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Abstract

There are many health-based nutritional benefits to be gained from Beetroot laddu, which is a highly nutritious sweet dish. In addition, it provides a bright, tempting colour to the laddu, which has anti-oxidant properties. Beetroot is effective in lowering blood pressure and improving blood flow, as well as reducing obesity and overall mortality. 200g of beetroot has 86 calories, while desiccated coconut has 99 calories. The laddu contains jaggery that will help detoxify the liver and enhance immunity.

Beetroot is considered a food that promotes health because it contains essential components like vitamins, minerals, phenolic, carotenoids, nitrate, ascorbic acids, and Betalains that promote health. Betalains come in two varieties: betacyanin (red-violet pigment) and Betaxanthin (yellow-orange pigment). Their non-precarious, non-toxic, non-carcinogenic, and non-poisonous properties make them a popular food dye in the commercial world. The food industry is greatly benefited from beetroot, which can be utilized as a food colouring or additive in products like ice cream, yogurt, and other foods. Beetroot extract is utilized to elevate the redness of tomato pastes, soups, sauces, desserts, jams, jellies, sweets, and breakfast cereals.

By consuming beetroot laddu daily, boost your immune system, beets are high in fibre and promote the growth of good bacteria in your gut, hence it improves the digestive health and reduces the risk of constipation. Stored at a refrigeration temperature, it has a shelf life of 4 to 5 days.

Introduction

The Indian subcontinent's Laddu or laddoo is a sweet that is shaped like a sphere and contains various ingredients like sugar syrup or jaggery the most universal and ancient Indian sweet has been referred to as perhaps this [1]. Beetroot, known as Beta vulgaris L., is a plant that is part of the Chenopodiaceae family and has a bright crimson colour. Due to its medicinal properties and juice value, it is commonly called beet,

chard, sea beet, spinach beet, garden beet, and white beet. It is abundant in vitamins A, B1, B2, B6, and C, as well as minerals such as calcium, magnesium, copper, phosphorus, sodium, and iron. Increased blood flow and high blood pressure. It is beneficial for tumour reduction, decreasing the risk of obesity and overall mortality, heart disease, diabetes, and promoting healthy hair, increasing energy, and reducing overall weight. The beet root is comprised of several parts that possess a variety of medicinal properties, such as anti-oxidants, antimicrobial, antihypertensive, hepatoprotective, anti-inflammatory, anti-hyperglycemia, anti-cancer, and diuretic.[2].



Fig.1 Different Varieties of Laddu

Laddu is a traditional Indian sweet that is made from cereal and is highly scrumptious. Among all age groups and regions in India, it is a favourite and a perfect choice for value addition. [8,9]. The protein quality, dietary fibre, and mineral content of Bengal gram flour laddu can be improved further by adding germinated pumpkin seed flour. Keeping all this in view, the present study was carried out with the objective of value addition in Indian traditional sweet 'laddu' by supplementing with germinated pumpkin seed flour and study the organoleptic acceptability and nutritional composition of developed product [3]

Red beetroot is the basis of many dietary supplements and functional foods in the market. [4]. beetroot usage for food application have been investigated by various researchers and food industries due to prevailing effect of their colour, flavour and nutritional aspect making it a super food

and a miracle vegetable. Deep red coloured beets can be consumed by humans as a food source, either fresh or as a salad ingredient. Antioxidant activity and bio accessibility of phytochemicals are greatly influenced by the processing methods [5]. Beetroot is a significant source of health-promoting agents in a diet that has the potential to be therapeutic for various pathological disorders. Therefore, it is becoming increasingly popular as a nutritional approach to help manage cardiovascular disease and cancer [6]. Hence, beetroot is being incorporated in the laddu and is been enriched with sesame seeds.

Materials and methods

Materials required: Beet root – 200g, Milk – 10ml, Dry fruits, Shredded coconut – 15g, Shredded Jaggery – 100g, ghee – 15-20ml

Methodology

Step 1	Washing, peeling and shredding Fresh beetroots are washed, peeled and shredded finely and Taken in the clean pan.
Step 2	Mixing and heating Heat and pan and add 3 spoons of ghee and mix with shredded beetroot, cool until its raw smell goes.
Step 3	Cooking After sometime beetroot shrinks well due to heat.
Step 4	Roasting of sesame seeds Take another pan and make dry roast of sesame seeds
Step 5	Mixing of shredded coconut Take 1 cup of desiccated coconut with crushed cardamom and mix well with sauteed beetroot.
Step 6	Addition of milk and jaggery Add little milk for texture and for sweetness shredded or powdered jaggery is added.
Step 7	Making of laddu Make it as the small balls as laddu while making laddu add any of the sliced dry fruits and nuts.

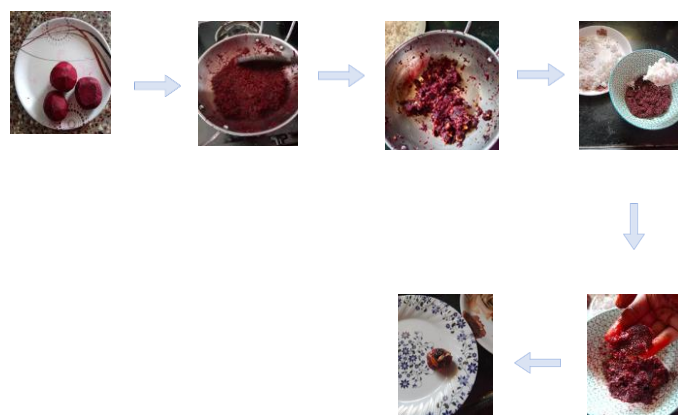


Fig 2. Preparation steps of Beetroot Laddu

Nutritional profile

Nutritive value	
Energy	110 Kcal
Protein	5g
Fat	8g
Carbohydrate	7g
Calcium	25g
Total folate	26.2µg

Benefits of Beetroot Laddu

The root vegetable *Beta vulgaris rubra*, or red beetroot, has gained much attention as a functional food that promotes health in recent years [7]. Ascorbic acid, carotenoids, phenolic acids, and flavonoids are among the phytochemical compounds found in beetroot. [8,9,10]. Beta-carotene is a group of highly bioactive pigments found in only a few vegetables, including beetroot [11,12]. The Betalains family has two categories: betacyanin pigments that are red-violet in colour or Betaxanthin pigments that are yellow-orange in colour. Each of these pigments is classified by colour [7]

Ghee, a unique fat, adds flavour to food articles and enhances their overall acceptability. Therefore, the flavour is the primary factor in determining its acceptability, and this can be greatly affected by various factors like the fermentation of the cream or butter and the heat treatments employed [13].

Jaggery (Gur) is a product that is made by concentrating the sweet juices from palm trees or sugarcane and making them solid or semi-solid. This natural sweetener can be utilized in numerous sweet dishes and has a sweet, winy fragrance and flavour. Jaggery has a lot of nutrients, including proteins, minerals, and vitamins. Furthermore, it is a powerful source of iron and contains more iron and copper than refined sugar [14].

The milk produced by dairy cows contains water, proteins, fats, lactose, minerals, and other dissolved components (vitamins and white blood cells). Water accounts for approximately 87% of milk, with protein accounting for 3.3%, fats accounting for 3.4%, lactose accounting for 4.9%, and mineral salts accounting for 0.7% [15].

Sesame seeds and their valuable components, such as oil, defatted meal, proteins, and bioactive compounds, and their efficient use deserve consideration. The health benefits of sesame seeds are significant, including lower blood pressure, antioxidant properties, and anticancer properties. In addition, these seeds are commonly utilized to deal with respiratory tract infections, infant cholera, diarrhoea, and other diseases that affect the digestive and bladder system [16].

Magnesium (19.5%), copper (16.0%), phosphorus (13.4%), and fibre (13.2%, insoluble/soluble) are among the nutrients found in almonds that are good sources [12]. Furthermore, almond proteins are digestible and contain an unusually high amount of arginine [17].

Conclusion

Beetroot is grown and consumed in both raw and cooked forms around the world due to their high nutritional and medicinal value. The essential nutrients found in beetroot are valuable and have an adequate amount of beneficial bioactive compounds, which are responsible for promoting health, preventing disease, and treating treatment. The recent years have seen an increase in the antioxidant activity of bioactive compounds and the successful use of beetroot in disease prevention and health promotion. To formulate functional foods, it is important to research and utilize the natural colorants,

antioxidants, and dietary fibre that are present in beetroot. Beetroot pulp's high bioactive compounds can be used as a functional food source to fight many diseases, like diabetes, cancer, cardiovascular disease and various other oxidative stresses induced chronic diseases. The incorporation of Beta vulgaris into food products can provide consumers with health benefits and create value-added products.

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