

## Preparation of Pastry with the addition of Carissa Carandas fruit powder and Evaluation of Sensory Attributes.

Muhammad Muzamil<sup>1</sup>, Noor-Ul-Huda<sup>2</sup>, Muhammad Shahzad<sup>3</sup>

1. Faculty of Food Science and Nutrition, Bahauddin Zakariya University, Multan.
2. Institute of Molecular Biology and Biotechnology, Bahauddin Zakariya University, Multan.
3. School of Medical and Health Sciences, Edith Cowan University Western Australia.

Correspondence Author: Muhammad Muzamil

### Abstract:

Many Plants have high nutritional content and used to increase the nutritional content of various products, especially in terms of minerals and vitamins. Karonda (Carissa Carandas) is evergreen and cultivated in Asia. Karonda fruit grows in summer and has a sour taste. Karonda contains various bioactive compounds which play an important role in the treatment of various diseases. It is used in various products to make the product nutritionally valuable. It also increased the physical characteristics of food products. In this study, Pastry is prepared by using karonda fruit extract and powder to check the overall sensory attributes of product. Karonda powder and karonda fruit extract are used in whipping cream. Karonda Extract and powder are used in various concentrations to check the sensory effect of each sample. The result showed that pastry sample 20 g of Karonda powder has better sensory attributes than others. Further studies should be done to check other effects of karonda on baking products.

**Keywords:** Fortification, Baking, Characteristics, Nutrition.

### Introduction:

Many wild plants have high nutritional content and can be utilized to increase the nutritional needs of both cattle and humans, especially in terms of minerals and vitamins. Plant species contribute a role for medicinal and nutritional benefits, food security, environmental benefits and revenue generation (Arora, 2014).

Carissa carandas (karonda) is a member of the family Apocynaceae. Different plant components are used in folk medicine to treat a variety of illnesses, including diabetes, diarrhea, stomachaches, scabies, intermittent fever, anorexia, mouth ulcers, sore throats, and itches. There are observations regarding flavonoids, cardiac glycosides, and triterpenoids as chemical compounds in the plant. Important biological activities from the plant have been recorded, including anti-nociceptive, anti-inflammatory, antipyretic, cardiotoxic, hepatoprotective, and anti-cancer properties (Bano et al., 2021).

Karonda is a sturdy, evergreen that is cultivated commonly in Asia. The plant is native to Pakistan and can also be found in India, the Siwalik Hills, the Western Ghats, Nepal, Sri Lanka, Indonesia, Malaysia, Myanmar, Afghanistan, Java, Australia, and South Africa. In Azad Kashmir, Pakistan, it is known with the name karonda (Khan et al., 2008).

Karonda is a native berry fruit (Rafique et al., 2023). The fruit grows in the summer and has a sour taste. It is generally oval or round and nearly about the size of a cherry (Meena et al.,

2020). It has high nutritional value and special sour taste. It is a neglected and undervalued fruit due to lack of awareness, regardless of its many nutritional benefits. The fresh karonda berries have the highest levels of vitamin C, anthocyanin and total phenolics contents, which can play role in enhancement of the immune system and can improve overall health (Rafique et al., 2023).

Karonda is used for preparing many products like pickle, jelly, jam, squash, syrup and chutney etc. The ripe fruit effuse gummy latex when it is cooked and give a rich red juice which becomes clear on cooling, Therefore, it is also used as a refreshing cold drink in summer (Arif et al., 2019).

Karonda fruits contain high amounts of protein, vitamin C, calcium, magnesium, phosphorous and iron. Besides, it is also a significant source of bioactive compounds like anthocyanins, phenols, antioxidants, flavonoids etc. Its intake in the daily diet can prevent our generations from the possibility of chronic disorder and malnutrition (Mahajan et al., 2022).

Its sweeter types may be consumed in raw form, but the more acidic types are consumed by boiling it with plenty of sugars as a food (Yadav et al., 2018). The ripe fruit is acidic and cool, and is used to treat mouth ulcers, skin disorders and sore throat. The fruits contain a notable amount of jelly grade pectin (Dey et al., 2017). The fruits also play a supplementary role in dyeing and tanning for medicinal purposes. The unripe fruit is astringent, sour, bitter, constipating, thermogenic, antipyretic, anaphrodisiac and useful in depraved conditions such as kapha and pitta, hyperdipsia, anorexia, diarrhea and intermittent fevers. The ripe fruit is sweet, cool, antiscorbutic and appetizer, and is useful in paresthesia, skin diseases and scabies etc. (Meti et al., 2023).

Dried karonda fruit contains iron (3.14%), calcium (2.68%), zinc (133.5mg/kg), manganese (257.5mg/1000g) and potassium (1.95%) while fresh karonda fruit contains iron (42%), calcium (24%), manganese (533.5mg/kg), zinc (413.6mg/kg) and potassium (79.13%) (Rafique et al., 2023).

Fresh Karonda fruit contains (moisture 66.50%; crude fat 2.57%; crude fiber 1.01%; ash 1.81%; PH 6.70; TSS 1.81%; total acidity 1.87%; Vitamin C 72mg/100g; TPC 17.20mg GAE/g; reducing sugar 2.300%; total sugar content 5.90%; antioxidant activity 0.0249%; flavonoid content 0.8550%; anthocyanin content 12.18%; carbohydrates 28.165%; energy content 17.500 joules). While dried karonda fruit contains (moisture 36%; crude fat 19%; crude fiber 4.90%; ash 4.98%; PH 8.1; TSS 5.60%; total acidity 0.45%; Vitamin C 49mg/100g; TPC 52.50mg GAE/g; reducing sugar 2.900%; total sugar content 8.05%; Antioxidant activity 0.180%; flavonoid content 1.4450%; anthocyanin 50.095%; carbohydrate 35.00%; energy content 43.500 joules. (Rafique et al., 2023).

This article is about the study of using karonda in pastry. Even though karonda is used in various products but there is not sufficient information available about using karonda in baking products. Pastry is the most used and demanded baking product by consumers. Karonda has a good amount of minerals and phytochemicals. It not only increases the nutritional profile of pastry but also provides a unique taste.

### Material and Methods:

The material consisted of sugar, eggs, white flour, Vanilla, Karonda powder and Karonda Extract. All the raw material was obtained from the local market.

### Sample Preparation:

Four samples were prepared using one as a control sample containing wheat flour (100 g), sugar (87.5 g), Eggs (2), Vanilla essence (0.5 tbsp). While the second sample contained white flour (90 g), Karonda powder (10 g), sugar (87.5 g), Eggs (2), Vanilla essence (0.25 tbsp) and Karonda Extract (0.5 tbsp) for used in whipping cream. Third Sample contained white flour (80 g), Karonda powder (20 g), sugar (87.5 g), Eggs (2), Vanilla essence (0.25 tbsp) and Karonda Extract (1 tbsp). The fourth sample contained white flour (70 g), Karonda powder (30 g), sugar (87.5 g), Eggs (2), Vanilla essence (0.25 tbsp) and Karonda Extract (1.5 tbsp).

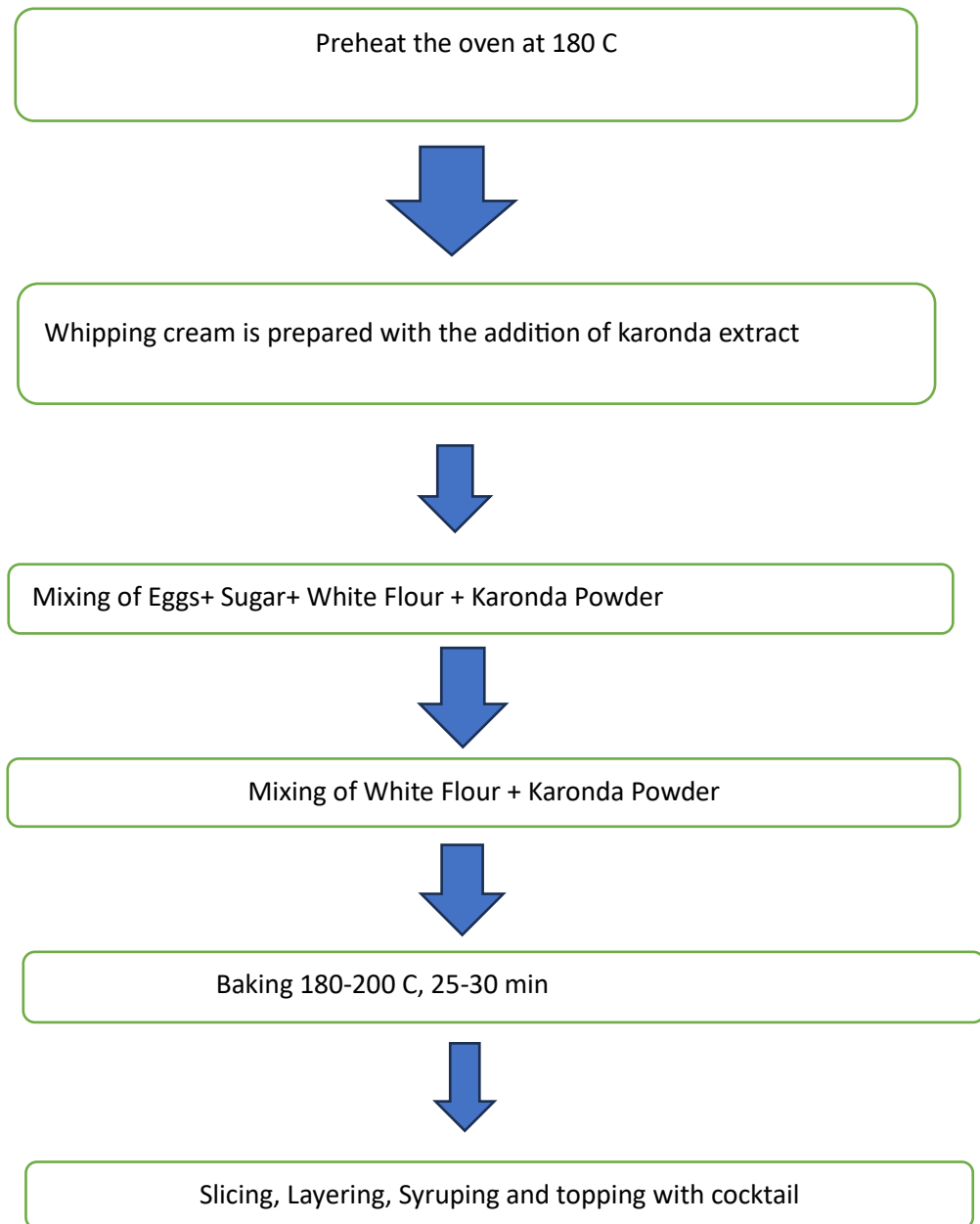
Table 1: Different Sample trials with different amounts of karonda powder and extract.

Sample	Karonda Extract	Karonda Powder
Control	0	0 g
T-1	0.5 tbsp	10 g
T-2	1 tbsp	20 g
T-3	1.5 tbsp	30 g

### Pastry Preparation:

Whipping Cream were prepared with the karonda extract and placed in a freezer. Then mix eggs and sugar in a separate bowl and beat them properly. Then mix white flour and Karonda powder in a separate bowl. Mixed both mixtures properly and Batter prepared. Pour the batter into the trays after greasing and placing butter paper in trays. Bake the mixture at 180-200 C for 25-30 minutes in the deck oven (pre-heated at 180C). Then cut the sponge horizontally into two layers. Then syruling and creaming along with the cocktail topping and Pastry prepared for sensory evaluation.

**Figure 1:** Flow line diagram of pastry formulation process.



**Figure 2:** Pastry with the addition of Carissa Carandas fruit powder.



### **Sensory Evaluation:**

#### **Consumer Effective Test:**

In this test, large group of Untrained panelists are recruited where they were asked about the liking or disliking of the product. In the present study a total number of 50 students from Bahauddin Zakariya University, Multan was recruited to evaluate the consumer acceptance of Karonda fortified pastry. The test was performed as stated by (Cheong et al., 2011). The test was conducted in the sensory laboratory of Bahauddin Zakariya University, Multan. The pastries were cut into slices of 1 cm (about 0.39 in). And then further cut in squares with 4cm (about 1.57 in) × 4 cm (about 1.57 in). Samples were coded with random numbers and placed on a polystyrene plate and presented to untrained panelist, randomly. Panelists were asked to rate their degree of liking and disliking through 9-point hedonic scale. Before tasting each sample, panelists were advised to clean up their palate to remove previous sample taste effect for better quality test. Hedonic scale consisted of points 1. dislike extremely, 2. dislike very much, 3. dislike moderately, 4. dislike slightly, 5. neither like nor dislike, 6. like slightly, 7. like moderately, 8. like very much, 9. like extremely.

#### **Quantitative descriptive analysis (QDA):**

QDA test was performed according to method described by (Cheong et al., 2011). A trained group of panelists are asked to rate the sensory attributes of pastry products by using a set of numerical scales. In present study 10 trained panelist were recruited from different food industries of south Punjab, Pakistan and some panelist from Faculty of Food Science and Nutrition who were experienced and trained in sensory evaluation. These panelists were trained

in sensory evaluation of pastry products like color, flavor, texture, aroma and overall acceptance in a detailed session. Panelists rate the sensory attributes by using a 15 cm (about 5.91 in) long scale from low to high intensity. Before tasting each sample, panelists were advised to clean up their palate to remove previous sample taste effect for better quality test. Samples were cut into slices of 1 cm (about 0.39 in). And then further cut into squares with 4cm (about 1.57 in) × 4 cm (about 1.57 in). Samples were coded with random numbers and placed on a polystyrene plate and presented to a trained panelist, randomly. The test was performed in the sensory evaluation lab of Bahauddin Zakariya University, Multan.

## Result and Discussion:

### Consumer Effective Test:

Sensory attributes are evaluated by a nine-point hedonic scale. The panelists given different ratings. The mean deviation taken by the formula:

$$\text{Mean Deviation} = \text{Sum of ratings by panelists} / \text{No. of Panelists}$$

Each attribute rating was determined by this formula and then overall acceptance is measured. The table showed that the control sample has a rating of 8.10 for color, 7.00 for flavor, 8.10 for texture, 8.00 for aroma and overall acceptance of 7.08. T-1 sample showed rating 6.90 for color, 6.10 for flavor, 7.90 for texture, 7.95 for aroma and 7.21 overall acceptance. T-2 sample showed 8.00 for color, 8.00 for flavor, 8.10 for texture, 7.95 for aroma and 8.01 overall acceptance. While T-3 sample showed 7.00 for color, 5.00 for flavor, 6.00 for texture, 5.40 for aroma and 5.85 overall acceptance. The result stated that T-2 sample has good color, flavor, texture, aroma and overall high acceptance for the consumers. While in T-3 the sensory attributes rating started reduced because of high amount of karonda extract and powder

Table 2: Sensory Characteristics of Pastry Samples in Consumer effective test.

Sample	Color	Flavor	Texture	Aroma	Overall Acceptance
Control	8.10	7.00	8.10	8.00	7.08
T-1	6.90	6.10	7.90	7.95	7.21
T-2	8.00	8.00	8.10	7.95	8.01
T-3	7.00	5.00	6.00	5.40	5.85

### Quantitative Description Analysis:

In quantitative description analysis, sensory attributes were evaluated by nine-point hedonic scale to check color, flavor, texture, aroma and overall acceptance by trained panelists. The average mean was taken by the formula of sum of ratings of panelists divided by the total number of panelists. The table showed ratings of 7.50 for color, 7.50 for flavor, 8.10 for texture, 7.90 for aroma and 7.75 for overall acceptance. T-1 showed 7.10 for color, 6.40 for flavor, 7.95

for texture, 8.00 for aroma and 7.36 overall acceptance. T-2 sample showed 8.00 for color, 8.50 for flavor, 8.00 for texture, 8.50 for aroma and overall acceptance of 8.25. T-3 showed 7.00 for color, 6.50 for flavor, 5.00 for texture, 6.00 for aroma and overall acceptance 6.12. T-2 showed high hedonic scale rating for color, flavor, texture, aroma and overall acceptance. While T-3 showed less sensory attributes rating of color, flavor, texture, aroma and overall acceptance.

Table 3: Sensory Characteristics rating of pastry samples by trained panelists.

Sample	Color	Flavor	Texture	Aroma	Overall Acceptance
Control	7.50	7.50	8.10	7.90	7.75
T-1	7.10	6.40	7.95	8.00	7.36
T-2	8.00	8.50	8.00	8.50	8.25
T-3	7.00	6.50	5.00	6.00	6.12

### Conclusion:

Karonda contains high content of protein, vitamin C, calcium magnesium, iron etc. It is also a significant source of bioactive compounds like anthocyanins, phenols, antioxidants, flavonoids etc. Its intake in the daily diet can prevent our generations from the possibility of chronic disorder and malnutrition. Karonda is used in various products like jams and jellies. But additions in bakery products was not observed. It can be used in baking products such as pastry. The result showed that karonda has a good sensory attribute and has overall good acceptability. Instead of this, it increases the nutritional profile, minerals content of product. Karonda consists of various bioactive compounds which play a role in the treatment of various diseases. Karonda should be added in furthermore baking products because it provides good sensory attributes and also increase nutritional profile. Further effects of karonda should be observed on products.

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