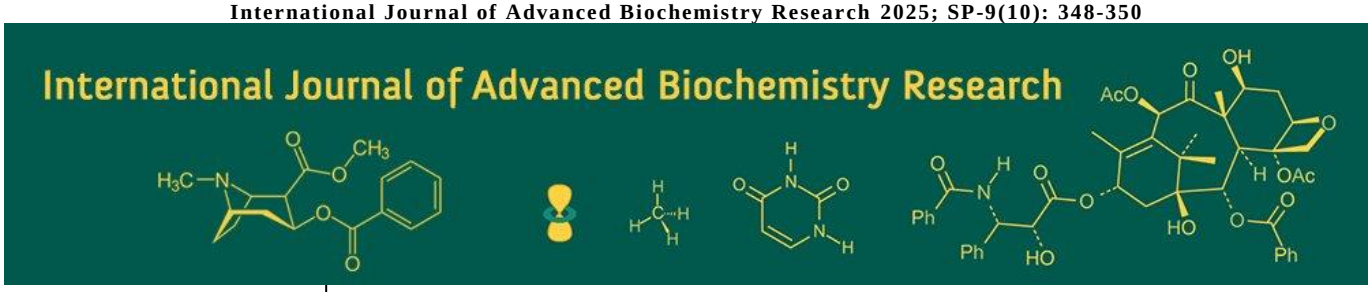

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Physico-chemical parameter of raw jackfruit (*Artocarpus heterophyllus* Lam.)

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Abstract
The lab experiment was carried out in 2024-2025 at the Horticultural Processing Laboratory, Krantikari Debridhur College of Horticulture and Research Station, MGUVV, Jagdalpur, Bastar (C.G.). The trial used Completely randomized design (CRD) with 11 treatments and 3 replications. Due to its climacteric nature, jackfruit must be transformed into pasta or another value-added product in order to be supplied throughout the year. The fruit shape of raw jackfruit was observed ellipsoid. The length of fruit (cm), width of fruit (cm), weight of fruit (g) and moisture content (%) of fruit was recorded 30.26 cm, 16.16 cm, 2.194 kg and 81.10% respectively. The observed such as TSS (°Brix), pH, titratable acidity (%), ascorbic acid (mg/100 g), total sugar (%), reducing sugar (%) and non-reducing sugar (%) were recorded 6.1°Brix, 5.37, 0.34%, 8.33 mg/100 g, 5.41%, 4.30% and 1.11% respectively.

Keywords: Jackfruit, physico-chemical, analysis, titratable acidity, ascorbic acid, reducing sugar, total sugar, non-reducing sugar, pH and TSS

1. Introduction
Recent years have observed an upward trend in the popularity of jackfruit, a tropical fruit famous for its distinguishable flavour, texture and versatility. Vitamin C, potassium and dietary fiber are just some of the many nutrients that are rich in the fruit (Khan *et al*. 2021). Moreover, it has been determined that jackfruit offers several of health advantages, including supporting good skin and supporting digestion. Patients suffering from diabetes can benefit through consuming tender jackfruit, that has a low glycaemic index (Rana *et al*. 2019). Tender jackfruit can help stabilize blood sugar levels while it has a low glycaemic index of 50. Further, it has an excessive amount of dietary fiber, which could decrease sugar levels increases by prolonging the uptake of starches. The entire tree has a number of therapeutic uses. The antibacterial, anti-inflammatory, anti-diabetic, antioxidant, antifungal and immune-dilatory abilities of the plant are adequate (Ranasinghe *et al*. 2019) [5]. In 2023-24, 3292 metric tonnes of jackfruit were produced annually on 1,86,000 hectares of land in India (Anonymous 2023-24) [1]. In Chhattisgarh 10000-hectare area is covered under jackfruit cultivation with the production of 204000 metric tonnes (Anonymous 2023-24) [1] and In Bastar 695-hectare area is covered under jackfruit cultivation with the production of 17642 metric tonnes (Anonymous 2023-24) [1].

2. Materials and Methods
2.1 Experimental site
Laboratory trial was carried out at Horticultural Processing Laboratory, Krantikari Debridhur College of Horticulture and Research Station (MGUVV) Jagdalpur, Bastar (C.G.)-494001.

2.2 Physical characteristics of raw jackfruit
2.2.1 Fruit shape
Using fruit shape desiccators, the fruit shape was measured (A.O.A.C. 1980) [2].

2.2.2 Fruit length (cm)
Using a measuring-tape, the fruit's length (cm) was measured from the apex to the stem end and the average result were displayed.

2.2.3 Fruit width (cm)
A measuring-tape was used to measure the fruit's width (cm) at its widest point and the mean result was displayed.

2.2.4 Fruit weight (g)
Using an electronic balance the weight of the fruits was measured and reported in kilograms (g).

2.2.5 Moisture content
According to Ranganna (1977) [6], moisture content was measured by following formula:

$$\text{Moisture Content (\%)} = \frac{\text{W1(Initial weight)-W2(Initial weight)}}{\text{W1 (Initial weight)}} \times 100$$

2.3 Chemical characteristics of raw jackfruit
2.3.1 Total soluble solids (ºBrix)
A hand refractometer was used to assess the total soluble solids (TSS°Brix) of jackfruit pasta.

2.3.2 pH
Jackfruit pasta's pH was measured with the help of pH meter.

2.3.3 Titratable acidity
10 grams of the homogenized pulp, powder and pasta was taken in a beaker, mix it well and then use phenolphthalein as an indicator to titrate the sample solution against 0.1N sodium hydroxide. The final point is indicated by a light pink appearance (Ranganna 1977) [6].

$$\text{Acidity} = \frac{\text{Titre} \times \text{Normality of NaOH} \times \text{volume made up} \times \text{Equivalent weight of acid} \times 100}{\text{Volume of sample taken} \times \text{Wt./Volume of sample taken} \times 1000}$$

2.3.4 Ascorbic acid
A 2-6 dichlorophenolindophenol (dye) visual titration method slightly modified from Ranganna's (1986) [7] description was used to measure ascorbic acid amount.

$$\text{Ascorbic acid (mg/100 g)} = \frac{\text{Titre value} \times \text{dye factor} \times \text{volume made up} \times 100}{\text{ml of aliquot taken} \times \text{wt./vol. of sample taken for for estimation estimation}}$$

2.3.5 Total sugar

$$\text{Total Sugar (\%)} = \frac{\text{Factor (0.052) x Dilution}}{\text{Titre x weight of sample}} \text{ x } 100$$

To measure the total sugar, fill a 250 ml flask with a 50 ml solution of clarified sugar. Five millilitres of HCI are added and the mixture is permitted to rest at room temperature (20°C or above) for a full 24 hours. 0.1 N NaOH is used in combination with a phenolphthalein indicator to reverse this and replenish the volume. It was titrated and the value was noted. The sugar content was all shown as a percentage.

2.3.6 Reducing sugar
Ranganna (1977) [6] explained how reducing sugars were estimated using Lane and Eynon's titrimetric methods.

$$\text{Reducing Sugar (\%)} = \frac{\text{Factor (0.052) x Dilution}}{\text{Titre x weight of sample x 1000}} \text{ x } 100$$

2.3.7 Non reducing sugar
The reducing sugar value was subtracted from the total sugar sample to determine the non-reducing sugar value (Ranganna 1986) [7].

Non-reducing sugar (%) = Total sugar (%)-Reducing sugar (%)

3. Result and Discussion
3.1 Physico-chemical characteristics of raw jackfruit
The physical and chemical characteristics of the raw materials were assessed in order to establish the quality of the finished product. The physico-chemical characteristics were studied *viz.*, fruit shape, fruit length (cm), fruit width (cm), fruit weight (g), moisture content (%), drying time, total soluble solids (°Brix), pH, titratable acidity (%), ascorbic acid (mg/100 g), total sugar (%), reducing sugar (%) and non-reducing sugar (%) were observed and presented in Table 1 and 2.

3.1.1 Physical characteristics of raw jackfruit
The physical characteristics of raw jackfruit have been listed in Table1. The fruit shape of raw jackfruit was observed ellipsoid. The average length of fruit (cm), width of fruit (cm), weight of fruit (g) and moisture content (%) of fruit were recorded 30.26 cm, 16.16 cm, 2.194 kg and 81.10% respectively.

Table 1: Physical characteristics of raw jackfruit

S. No.	Parameters	Average ± SD
1	Fruit Length (cm)	30.26±1.15
2	Fruit Width (cm	16.16±1.47
3	Fruit Weight (kg)	2.194±0.30
4	Moisture Content (%)	81.10±0.40
5	Fruit Shape	Ellipsoid

3.1.2 Chemical characteristics of raw jackfruit
The chemical properties of raw jackfruit are reported in Table 2. The observed such as TSS (°Brix), pH, titratable acidity (%), ascorbic acid (mg/100 g), total sugar (%), reducing sugar (%) and non-reducing sugar (%) were recorded 6.1°Brix, 5.37, 0.34%, 8.33 mg/100 g, 5.41%, 4.30% and 1.11% respectively.

Table 2: Chemical characteristics of raw jackfruit

S. No.	Parameters	Average ± SD
1	TSS (°Brix)	6.10±0.1
2	pH	5.37±0.05
3	Titratable acidity (%)	0.34±0.07
4	Ascorbic acid (mg/100 g)	8.33±1.44
5	Total sugar (%)	5.41±0.93
6	Reducing sugar (%)	4.30±0.27
7	Non-reducing sugar (%)	1.11±0.67

4. Conclusion
Jackfruit is a filled with nutrients fruit that is high in natural sugars, moisture and vitamin C. Patients with diabetes can benefit from its low glycaemic index as well as significant dietary fiber content. The study found that raw jackfruit has 81.10% moisture, 6.10 °Brix TSS and 8.33 mg/100 g ascorbic acid. These results demonstrate that jackfruit may be a useful ingredient in the production of nutritious foods

including chips, snacks, and flour. It is a useful fruit for both consumers and the food industry because of its nutritional and medicinal properties.

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