

## JACKFRUIT SEED FLOUR AS AN ALTERNATIVE DIET DURING FASTING (IN COMBINATION WITH BUCKWHEAT AND WATER CHESTNUT FLOUR)

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### Abstract

*This research mainly focused on encouraging the use of underutilized jackfruit seed in form of flour. Jackfruit seeds are not used because people find it difficult to store fresh seeds and are unaware of its health benefits but storage is easy in the form of flour. These are also good supplement of protein hence its use in snacks is a great step towards reducing malnutrition. This paratha was prepared with incorporation of water chestnut and buckwheat flour which are gluten free flours, very beneficial for people suffering from celiac disorder. The parathas with these ingredients are very useful for the working ladies. These could be prepared in no time and are healthy with no chemical preservative added to them. The main advantage of the product is that it can be consumed during fast because there are very less options with appreciable amount of protein in it but due to the incorporation of jackfruit seeds flour, this product is a great option to fulfill person's caloric as well as nutritional requirement. There is no ready to eat food product for consumption during fast. Under this research two samples (first sample T<sub>1</sub> constituted 40%, 30%, 30% whereas sample T<sub>2</sub> contained 70%, 15%, 15% of jackfruit seed flour, buckwheat flour and water chestnut flour respectively) were prepared and evaluated. Among T<sub>1</sub> and T<sub>2</sub> variants T<sub>1</sub> was found to be more acceptable.*

**Keywords:** Jackfruit, buckwheat, Water chestnut, Underutilized, Fasting, Frozen snacks

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### 1. INTRODUCTION

Paratha is an important part of Indian cuisine. In Northern India wheat is considered to be the traditional staple food and wheat flour is traditionally used to make variety of paratha which are typically consumed as breakfast or as a lunchbox snack. The ready to use frozen paratha with incorporation of buckwheat and water chestnut flour is easy to make and it could fulfill consumers' nutritional requirement. The ready to use foods does not need any additional cooking and are edible without further preparation. These are usually preserved in cold temperature or at room temperature, said by Mishra S, Mishra S (2016). The ready to use frozen products are really easy to make in a very less time, which is the reason for popularity among the families of working women. This product could also be consumed during fast like navratri, because all the ingredients are religiously

acceptable. Fasting has many health related benefits like stress resistance, reduced morbidity, insulin sensitivity and increase in life span but fasting also results in weakness, headache, flatulence and acidity, studied by Singh R, Mishra S (2012). Hence it is highly recommended to take some compensatory food during fasting to reduce the bad health effects. In market there are very less products which could be used during fast. Ingredients are jackfruit seed flour, buckwheat flour, water chestnut flour, rock salt, cumin seeds, chilies and coriander. This tasty and healthy frozen paratha could be stored easily in cool and dry place in air tight container for considerably long time. This product also encourages the use of an underutilized plant part i.e. jackfruit seed.

**Jackfruit** (*Artocarpusheterophyllus Lam.*) belongs to Moraceae family. It is native fruit of India and is originated from rain forest of Western Ghat. Jackfruits are used in many

dishes all over the world but its seeds are underutilized. Generally jackfruit seeds are not consumed or consumed in limited ways. Jackfruit seed flour contains 16.01% protein which is good amount in comparison to other flours. Fat percent is low only up to 0.98%. It is also rich in minerals like potassium (705.71mg/100gm), calcium (115.85mg/100gm), magnesium (96.75mg/100gm). It contains dietary fiber (3.56%) which prevents constipation and produces smooth bowel movement. Dietary fibers help to protect the inner mucous membrane of colon from the gastric juice. The extracted protein consisted of various essential amino acids like lysine, isoleucine, leucine, methionine, threonine, valine and histidine. Analysed by Sultana A. et al. (2017). Seeds also contain antibacterial and antifungal activity. It also possesses antioxidant and anticarcinogenic properties described by Sreeletha AS et al. (2017). Many benefits from consumption of jackfruit seeds are suggested the most common ones are preventing skin wrinkles, anti-cancer property and promoting digestion. Jackfruit seeds are effective against diarrhea and dysentery. This seed is also helpful in bone health because rich in magnesium which is an essential mineral for absorption of calcium. It was analysed by Akter B, Haque MA (2018). Omale J, Friday E. (2010) found that jackfruit seeds contain lignans, isoflavones, saponins, all phytonutrients whose health benefits are wide ranging from anticancer to anti-hypertensive, anti-aging, anti-ulcer. Theivasanthi T, Alagar M. (2011) said that jackfruit seeds may act as therapeutic agents for treating infectious diseases and preventing contamination by food-borne pathogens.

**Buckwheat** (*Fagopyrum esculentum*) is a member of family Polygonaceae is a multipurpose crop and is considered as pseudocereal with a high economic value and is also used in treatment of diseases. Yilmaz HO et al. (2020) described that buckwheat is rich source of vitamins and minerals and have positive impact on consumer's health because it acts as hypotensive, hypoglycemic,

hypocholesterolemic, neuroprotective and have antioxidant property. Kim et al. (2004) studied that it is also rich in protein, polysaccharides, lipid, dietary fiber. And therefore it has gained popularity as a functional food. Eggum B et al. (1980) found 12% of high quality protein in buckwheat. Biological value was more than 90% because of the presence of essential amino acids like lysine, tryptophan, sulphur containing amino acids and threonine.

**Water Chestnut** (*Trapabispinosa* or *Trapanatans*) belongs Trapaceae family. The fruit is rich in protein (1.87%), fibers (0.72%) and carbohydrate, it also contains vitamins like B1, B2, B5, B6, E, A, C. It was described by Singh GD et al. (2010). It also contains phytosterols, saponins, fat, fixed oil in seeds and in extract of pericarp trace presence of tannins, glycoside and flavonoids. and it is also gluten free which make it useful for the people who are suffering from celiac disease. The fruit is consumed in raw as well as in the cooked or boiled form. Its flour is often used for making preparations like pudding, cookies, cakes, fritters etc. Water chestnut is also utilized in ayurvedic preparations due to its high nutritive value and its properties like diuretic, astringent, cooling, anti-diarrhoeal, aphrodisiac etc. Organoleptic or sensory evaluation is often done in the industries to ensure products quality for every quality attributes. It is always done by trained and semi-trained panelist members for every quality attributes and determine the quality, similarity, differences, improvement of products as well as its ingredients. Objective of the research was to prepare frozen paratha with jackfruit seed, buckwheat and water chestnut flour and to evaluate sensory qualities and acceptability.

## 2. MATERIALS AND METHODS

For this experiment the ingredients were collected from the local market of Raebareilly and experiment was carried out in Research laboratory of Food Science and Technology, School for Home Science, BBAU, Lucknow.

## 2.1 Preparation

Preparation of jackfruit seeds flour was done by soaking the seeds and its outer covering was removed then they were sliced in to thin pieces and sun dried and further milled in to flour. The other ingredients (buckwheat, water chestnut, chilies, coriander leaves, ghee, cumin seeds and rock salt) were bought from local market. For preservation no preservative was used, it is natural and healthy home cooked product. For evaluation two types of samples were prepared T<sub>1</sub>, T<sub>2</sub>. Where flour amount is varied as shown in table 1.

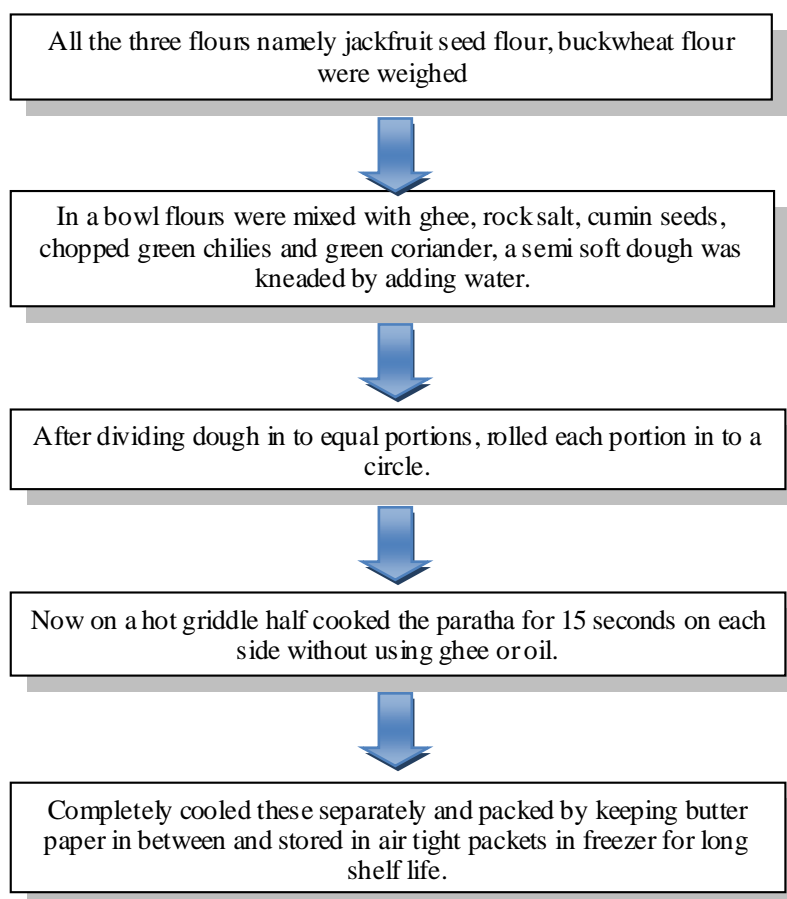
**Table 1. The percentage variation in samples**

Ingredients	T <sub>1</sub>	T <sub>2</sub>
Jackfruit seed flour	40%	70%
Buckwheat flour	30%	15%
Water chestnut flour	30%	15%

T<sub>1</sub> sample preparation (for 100g): jackfruit seed flour 36g, buckwheat flour 27g, water chestnut flour 27g, green chilies 4g, green coriander leaves 4g, cumin seeds 2g and ¼ table spoon of rock salt.

T<sub>2</sub> sample preparation (for 100g): jackfruit seed flour 63g, buckwheat flour 13.5g, water chestnut flour 13.5g, green chilies 4g, green coriander leaves 4g, cumin seeds 2g and ¼ table spoon of rock salt.

For evaluation and acceptability samples were tested by 20 members scored them on hedonic scale of 9 point from dislike extremely to like extremely for different attributes like Appearance, color, texture, taste, mouth feel and overall acceptability. T<sub>1</sub> and T<sub>2</sub> were prepared with the same procedure as shown in fig 1.



**Figure 1. Flow Chart showing steps for Preparation of frozen paratha (T<sub>1</sub>, T<sub>2</sub> variant)**

## 2.2 Statistical Analysis

Overall acceptability was calculated by using statistical formula for average and standard deviation on the basis of scores awarded by members to decide the better variant in terms of sensory qualities. Standard deviation was calculated by the following formula.

$$s = \sqrt{\frac{\sum(x_i - \bar{x})^2}{n - 1}}$$

Where *s* stands for standard deviation, *x<sub>i</sub>* stands for value in the data set,  $\bar{x}$  stands for mean, *n* stands for number of values in the data set.

## 3. RESULTS AND DISCUSSION

In present experiment for preparing frozen paratha with jackfruit seed, water chestnut and buckwheat flour were tasted and awarded scores for following parameters.

**3.1 Appearance, color and texture** - As shown in the table 2 between the variants T<sub>1</sub> and T<sub>2</sub> in terms of appearance, color and texture T<sub>1</sub> was more appreciated and scored, because with high percentage of jackfruit seed flour T<sub>2</sub> variant dough was dark in color, a little hard and rough while the T<sub>1</sub> variant was better in comparison. Hence a less percentage of jackfruit seed flour resulted in better acceptability.

**Table 2. Scores for Parameters: Appearance, Color and Texture**

Members	Appearance(P1)		Color(P2)		Texture(P3)	
	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>
Member 1	7	6	8	6	7	6
Member 2	8	7	7	5	7	5
Member 3	8	7	8	6	8	7
Member 4	7	5	8	5	8	5
Member 5	7	6	7	6	8	7
Member 6	8	6	7	5	8	5
Member 7	7	5	7	6	7	5
Member 8	8	5	8	5	8	6
Member 9	8	6	8	6	8	6
Member10	7	6	8	6	7	6
Member11	8	7	7	5	7	5
Member12	8	7	8	7	8	7
Member13	7	5	8	5	8	5
Member14	7	6	7	6	8	7
Member15	8	6	7	5	8	5
Member16	8	6	7	5	8	5
Member17	7	5	8	6	7	5
Member18	8	5	8	5	8	6
Member19	8	6	8	6	8	6
Member20	7	6	8	6	7	6
Total	151	118	152	112	153	115
Average	7.55	5.9	7.6	5.6	7.65	5.75

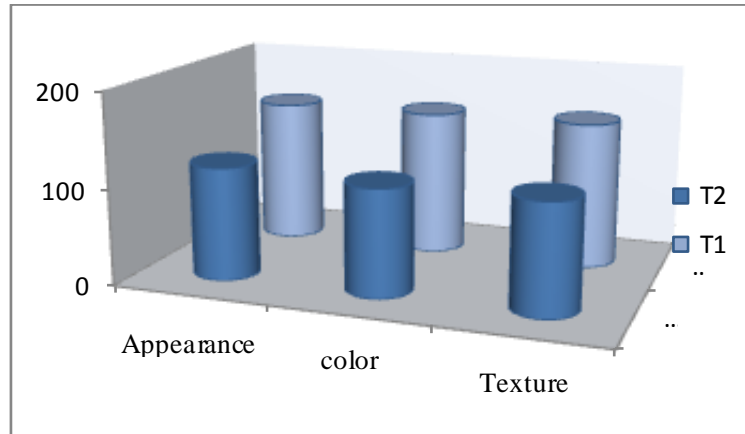


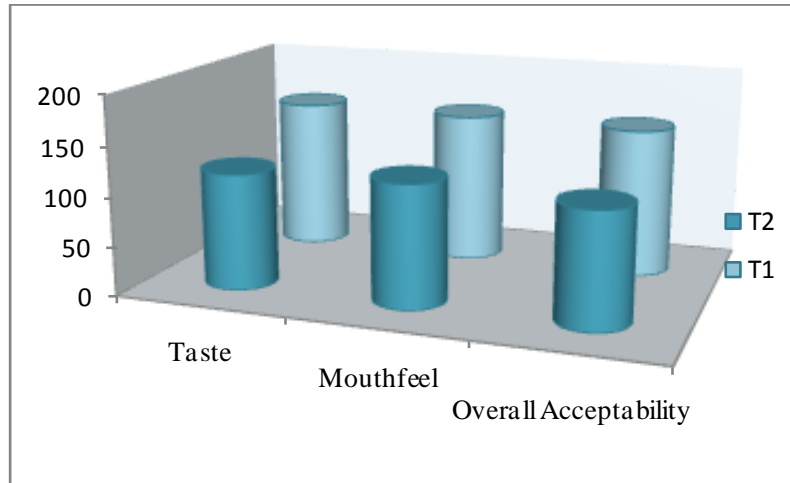
Figure 2. Graphical representation of Appearance (P1),Color(P2) and Texture(P3)

**3.2 Taste, Mouth Feel and Overall Acceptability-**In table 3 scores listed are according to taste, mouth feel and overall acceptability. From above scores it was observed that T<sub>1</sub> was again better than T<sub>2</sub> in terms of P4, P5 and P6. The parathas with higher percentage of jackfruit seed flour were

slight bitter in taste while in parathas with lower percentage of jackfruit seed flour, no bitterness was observed. In terms of mouth feel the T<sub>2</sub> scored less by the members in comparison to T<sub>1</sub>. Hence overall acceptability of T<sub>1</sub> was more than T<sub>2</sub> sample.

Table 3. Scores for Parameters: Taste, Mouth feel, Overall acceptability

Members	Taste(P4)		Mouthfeel(P5)		Overall acceptability (P6)	
	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>	T <sub>1</sub>	T <sub>2</sub>
Member 1	8	6	8	7	7	6
Member 2	7	5	8	6	8	5
Member 3	8	6	8	7	7	6
Member 4	8	7	7	6	9	6
Member 5	8	6	8	6	7	6
Member 6	8	6	8	7	8	6
Member 7	7	5	8	6	8	6
Member 8	8	7	7	6	7	5
Member 9	8	6	7	6	7	6
Member10	8	6	8	6	8	6
Member11	7	5	8	6	7	6
Member12	8	7	7	5	7	5
Member13	8	6	7	5	7	6
Member14	7	5	8	6	7	5
Member15	8	6	8	7	8	6
Member16	8	7	7	5	9	6
Member17	8	6	8	7	7	6
Member18	8	6	8	7	7	6
Member19	7	5	8	7	8	6
Member20	7	5	7	6	8	6
Total	154	118	153	124	151	116
Average	7.7	5.9	7.65	6.2	7.55	5.8

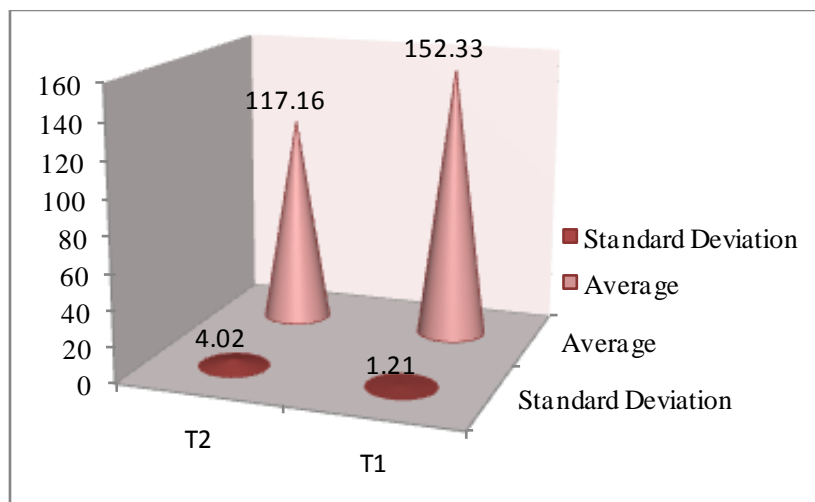


**Figure 3. Graphical representation of scores for Taste(P4),Mouth feel(P5) and overall acceptability(P6)**

**3.3 Statistical Analysis** - Table 4 shows the overall calculation of average scores given by each member for each parameter, with calculated average values and standard deviation of each sample on the basis of each parameter. The 2 variants T<sub>1</sub> and T<sub>2</sub> prepared for the study do not show much variation in their scores, very less value of standard deviation was obtained. T<sub>1</sub> with less standard deviation and more average score was more acceptable.

**Table 4. Statistical Analysis**

Parameters	T <sub>1</sub>	T <sub>2</sub>
P1	151	118
P2	152	112
P3	153	115
P4	154	118
P5	153	124
P6	151	116
Totalsum	914	703
<b>Average</b>	<b>152.33</b>	<b>117.16</b>
<b>Standard deviation</b>	<b>1.21</b>	<b>4.02</b>



**Figure 4. Graphical representation of Average and Standard deviation of variants.**



#### 4. CONCLUSION

The evaluation of the frozen paratha made with jackfruit seed, buckwheat and water chestnut flour was completed by use of hedonic scale of 9 points from extremely like to extremely dislike. The evaluation was done for different parameters like appearance, color, taste, texture, mouth feel with two variants T<sub>1</sub> and T<sub>2</sub>. T<sub>2</sub> with more amount of jackfruit seed flour(70%) was less acceptable because of its dark color and its texture was a little dry chewy and slight bitter in taste in comparison to T<sub>1</sub> which contains 40% of jackfruit seed flour and was light in color, was soft and not bitter. Hence T<sub>1</sub> variant was in all the parameters. These frozen paratha can be a good option as it is nutritious and healthy. It could be consumed during fasting as it is prepared with all the ingredients which are religiously allowed to be taken during fast.

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