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# Study on the Sensory Attributes of Pasta Incorporated with Corn Flour and Jackfruit Seed Flour

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**ABSTRACT: Pasta is a cold extruded staple food of Italian origin. It is a good source of energy and can give fiber, which further helps with stomach problems and lower cholesterol. Addition of functional ingredients by reducing the amount of refined wheat flour will improve nutritional and functional properties of pasta. In the present study trials were conducted to develop a functional pasta by partial substitution of refined wheat flour with 10% corn flour and 10 to 20 percent jackfruit seed flour. The study examined the impact of replacing refined wheat flour with jackfruit seed flour on the sensory assessment of pasta. The results of sensory characteristic evaluation with a nine-point hedonic scale showed that pasta incorporated with 10% jackfruit seed flour and 10% corn flour was acceptable to the panelists. The colour and appearance, flavour, body and texture of pasta with the incorporation of jackfruit seed flour obtained an acceptable score. Hence this jackfruit seed flour incorporated pasta is a potential functional food.**

**Keywords:** Cold extruded, Corn flour, Jackfruit Seed Flour, Sensory analysis.

## INTRODUCTION

Pasta is a cold extruded staple food made from unleavened dough which is stretched, extruded and cut into variety of shapes (Aalami *et al*., 2007). Extruded food materials undergo various transformations including starch gelatinization, fragmentation and protein denaturation which affect the properties of the extrudates (Dwivedi *et al*., 2017). In case of wheat pasta, durum wheat semolina or soft wheat flour is mixed with water (30-35%), shaped at low temperature (below 60°C) by extrusion or sheeting and dried. Gluten proteins make a visco-elastic network and keep the structure of pasta during drying and final cooking in boiling water (Gasparre and Rosell 2022). According to De Ruiter (1978) many processes have been proposed for making pasta from non-gluten cereals such as maize in admixture with wheat. Study conducted by Molina *et al*. (1976) suggested that 25-40% of wheat semolina can be replaced by precooked corn flour without lowering pasta quality. For higher substitution rates (upto 70%) a high temperature treatment is necessarily applied at the end of the drying process for maintaining acceptable pasta quality (Mestres *et al*., 1990).

Jackfruit is the largest edible tropical fruit in the world and widely grown in the warm and wet regions. FAO (2021) stated that India is the largest producer of jackfruit in the world. In India Odisha is the main producer of this fruit (Ministry of Agriculture, 2021). Jack fruit constitute 3 major components: pulp, seeds and rind. Golden-yellow pulp is arranged in fleshy bulbs that account for 30–35% of the fruit's weight and each include a single seed inside (Swami *et al*., 2014). The under-utilized parts such as seed and rind also contain great nutritional qualities.

A single fruit usually contains about 100–500 seeds. According to Ocloo *et al*. (2010) jackfruit seeds make up 10-15% of the total jackfruit weight and are good sources of protein and carbohydrate. They are high in starch, low in calcium and iron and good source of vitamin B (Mortan, 1987). Jackfruit seed contain phytonutrients like lignans, isoflavones, saponins and possess health benefits such as anti-cancer, anti-ageing and antioxidant properties (Noor *et al*., 2014). Bobbio *et al*. (1978) reported that jackfruit seeds contained 61.50 per cent moisture, 12.30 per cent protein, 25.10 per cent carbohydrates and 0.50 per cent crude lipids.

As per the study by Khan *et al*. (2016) quick germination of jackfruit seed makes it difficult to store with present storage facilities in many under developed countries. As a result, a huge amount of jackfruit seed is wasted. Conversion of seed to flour can enable the use of this nutrient rich product and mitigate post-harvest loss. This flour currently used in the development of various products and in value addition.

Jackfruit seed flour contains carbohydrates (82.25%), protein (11.17%), lipid (0.99%) and crude fiber (1.67%) (Tananuwong *et al*., 2002). Different types of extruded product can be prepared using jackfruit seed flourlike noodles, pasta, spaghetti etc. Currently research is

carried out in the formulation of extruded products with the incorporation of flour to replace portion of wheat flour. Thus, this study is aimed in development of pasta with value added with various flours devoid of gluten such as corn and jackfruit seed flour.

## MATERIALS AND METHODS

*A. Raw Materials*

The present study was carried out at the College of Food and Dairy Technology, Koduveli, Chennai, Tamil Nadu. The raw materials selected for this study were refined wheat flour, corn flour and roasted jackfruit seed powder. The former two were procured from the local market in Chennai and the latter one from Valley Spices, Kerala. The other ingredients like xanthan gum, salt and rice bran oil were purchased from the local market in Chennai.

*B. Formulation of Pasta*

Two combinations of pasta were formulated by substituting a portion of refined wheat flour with corn flour and jackfruit seed powder. For the preparation of pasta, the flours were mixed at different ratios as mentioned in Table1. The flour was supplemented with 1% xanthan gum, 45-50% water, 2% salt and 10% rice bran oil. The mixture was kneaded for 15 minutes. The moist flour aggregate was placed in the pasta extruder machine (Model: La Monferrina- Mini Pasta Making machine) fitted with an adjustable die followed by cutting. After extrusion, steaming process carried out for 15 minutes for complete starch gelatinization. Drying of steamed pasta was carried out in a solar dryer for about 5 hours (Raghu *et al.*, 2022).

**Table 1: Combination of ingredients used for the formulation of jackfruit seed flour incorporated pasta.**

| Sample | Refined Wheat Flour (g) | Corn Flour (g) | Jackfruit Seed Flour (g) | Xanthan Gum (g) | Water (ml) | Salt (g) | Rice Bran Oil (ml) |
|---|---|---|---|---|---|---|---|
| Control | 100 | - | - | - | 35 | 2 | 8 |
| T1 | 80 | 10 | 10 | 1 | 48 | 2 | 10 |
| T2 | 70 | 10 | 20 | 1 | 50 | 2 | 10 |

**Organoleptic Evaluation:** The boiled pasta was evaluated for its sensory quality based on colour and appearance, flavour, body and texture and overall acceptability by semi-trained panel lists consisting of Teachers and Post-Graduate students of the college using 9-point Hedonic scale (Ranganna, 1986) for all the treatments.

**Statistical analysis:** The results were subjected to statistical analysis. The means were compared using VETSTAT by Analysis of Variance (ANOVA).

## RESULTS AND DISCUSSION

Sensory score plays a major role in acceptance or rejection of any food product. Hence food products with highest sensory score are known to dominate the customer preference. Fig. 1 shows the pasta prepared by incorporating corn flour and jackfruit seed flour and Table 2 represented the sensory scores of the functional cooked pastas.


**Fig. 1.** The functional dried pasta samples incorporated with jackfruit seed flour.

**Table 2: Sensory score for the cooked formulated pasta samples.**

| Sensory Attributes | Treatments | | | F Value |
|---|---|---|---|---|
| | Control | T1 | T2 | |
| Colour & Appearance | $9.0^{c}\pm0.05$ | $8.6^{b}\pm0.04$ | $7.4^{a}\pm0.03$ | 277.33** |
| Body & Texture | $9.0^{b}\pm0.02$ | $9.0^{b}\pm0.01$ | $7.2^{a}\pm0.01$ | 521.44** |
| Flavour | $8.8^{c}\pm0.06$ | $8.0^{b}\pm0.05$ | $7.0^{a}\pm0.05$ | 173.17** |
| Overall acceptability | $8.9^{c}\pm0.02$ | $8.55^{b}\pm0.02$ | $7.05^{a}\pm0.03$ | 203.45** |

Control sample was the most acceptable among the treatments. The panel list preferred past as fortified with 10% jackfruit seed flour (T1). The addition of corn flour and xanthan gum improved its overall acceptability and was on par with control containing refined wheat flour. In case of body and texture no significant difference was noticed between control and sample T1.There was a highly significant difference in colour and appearance, body and texture and flavor between T1 and T2, thus indicating a higher overall acceptability score for T1 (10%) than T2 (20%).

Trials conducted by Abraham and Jayamuthunagai (2014) showed that the colour of pasta changed with the addition of 10% jackfruit seed flour as was observed in the present study. They also mentioned that flavour of jackfruit seed was easily recognizable in pasta with the addition of 15% and 20% seed flour.

The results in the present study are in consonance with the findings of Thejas *et al*. (2021) in jackfruit seed

powder and tapioca flour pasta. Swathi *et al*. (2019) in jackfruit bulb flour, jackfruit seed flour, cassava flour and amaranthus pasta where the former used 10% jackfruit seed flour and latter 30%.

## CONCLUSIONS

In the present study, pasta made from 10% jackfruit seed flour and 10% corn flour was well received. Replacement of wheat flour with these ingredients led to changes in the sensory characteristics of pasta. The study revealed that incorporation of jackfruit seed flour affects the sensory characteristics of pasta beyond 10%. As per the study, adequate flavouring compound to could be used as a snack for various age groups. This would also enable us to explore the functional properties of jackfruit seed flour and its incorporation in various cold extruded products.

## FUTURE SCOPE

Along with these, other functional ingredients can be incorporated to improve the nutritional as well as functional properties of pasta.

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**Conflict of Interest**. None.

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