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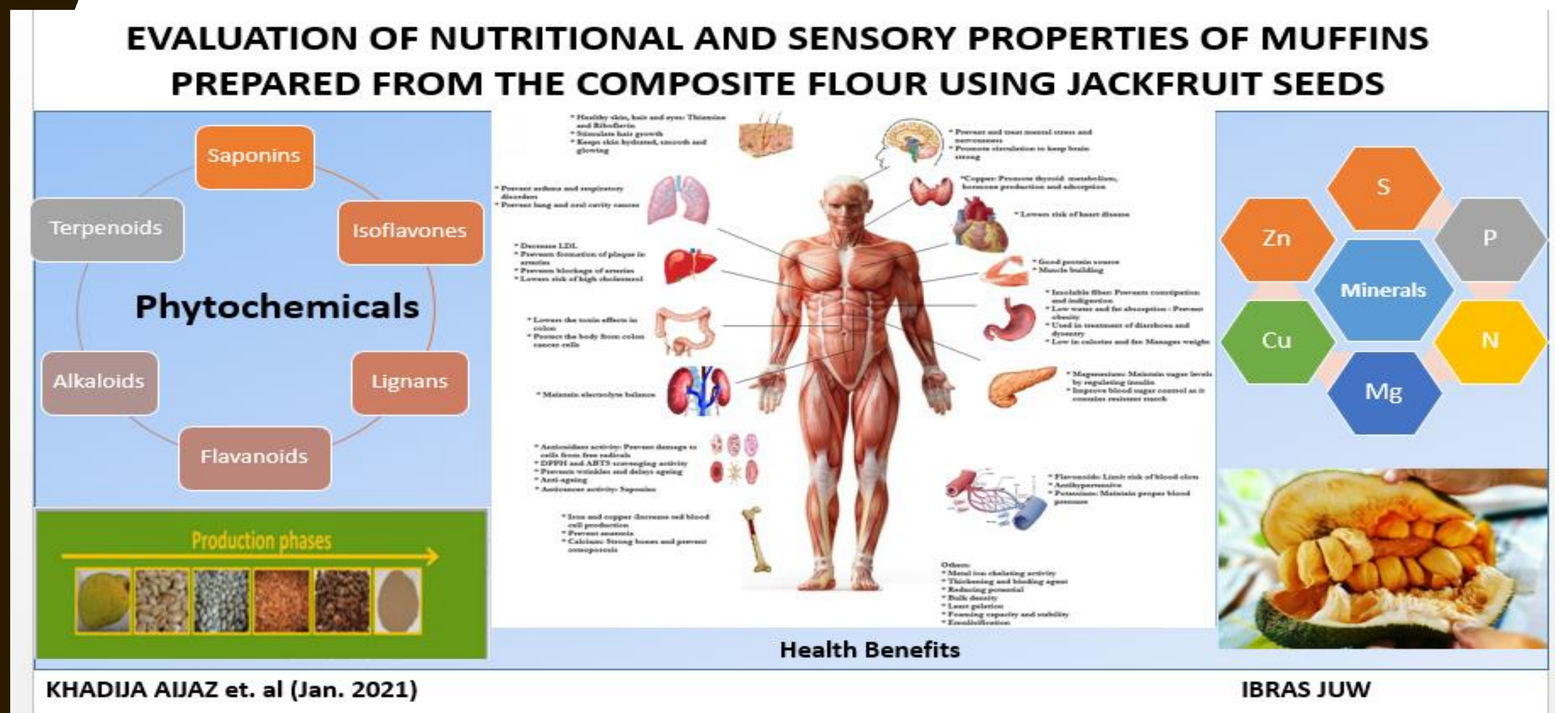


Discussion

- The study is aimed to develop muffins with incorporation of jackfruit seed flour to create nutritionally rich product of good quality.
- The nutritional composition of *jackfruit* (Artocarpus heterophyllus) varies according to different varieties.
- Jackfruit is low in calories and also contains different phytochemicals that includes phenolic compounds. It is also a rich source of antioxidants which helps in protection from different diseases.
- A single jackfruit may contain 100 – 500 seeds which make up approximately 10-15% of the total fruit weight.
- The seeds are usually discarded but can be incorporated with the plain white flour and stored for a longer time. This blended flour can then be used to manufacture nutrition rich bakery products.

Methods and Materials

Preparation of Jackfruit Seed Flour:

Collection of jackfruit seed → Removal of defected seeds → Brown layer of seeds washed with distilled water → Cut into slices of 2 mm → Blanching at 70˚C with 0.5% KMS for 10 minutes → Drying at 60˚C for 24 hours → Grinding into powder → Sieving → Packing

Preparation of Muffins:

- The plain white flour will be mixed with different proportions of jackfruit seed flour in proportions of 10%, 20%, 30% and 40% respectively.
- The other ingredients used for making the traditional vanilla muffins included white granulated sugar, baking powder, salted butter, eggs, milk and vanilla essence.
- The muffins prepared from plain white flour were taken as control sample.
- The dry and wet ingredients are to be mixed separately during muffin preparation.
- The liquid mixture is to be added with the dry ingredients, and the batter mixed.
- The batter is now ready to be poured into muffin cups in a muffin tray.
- In a preheated oven, this will be baked at 190 °C for 15 min.

Results

- The traditional vanilla muffins were compared with the muffins produced from composite flour.
- The incorporation of jackfruit seed flour increases the specific gravity and also decrease the viscosity of muffins produced.
- The results showed that the flour prepared from jackfruit seeds can be used as a replacement for the plain white flour as nutritionally rich products can be produced.

Phytochemical analyzed	Tests performed	Results		
		Aqueous Extract	Hydro-alcoholic Extract	Methanolic Extract
Carbohydrates	Molisch	+	++	+++
	Benedict's	+++	+	++
	Fehling's	++	++	+
Alkaloids	Mayer's	-	-	-
	Wagner's	++	+	+
	Dragendroff's	+	-	++
Saponins	Foam Test	+	++	+++
Glycosides	Modified Borntrager's	+	+	+
Phytosterols	Salkowski's	-	-	-
Flavonoids	Flavonoid	+	+	+
Proteins and Amino Acids	Xanthoproteic	+++	++	+
	Ninhydrin	+	++	+++
	Millon's	-	-	-
Tannins	Ferric chloride	+	++	+++
Terpenoids	Salkowski's	+	++	+++

- denotes absence, +denotes presence, + +denotes average, +++ denotesabundance of phytochemicals

Table 1. Phytochemical investigation of Artocarpus heterophyllus (jackfruit) seed

Source: Bhat, Vaishnavi et.al. "Pharmacognostic and Physiochemical Studies of Artocarpus heterophyllus Seeds", International Journal of ChemTech Research, 2017/01/01

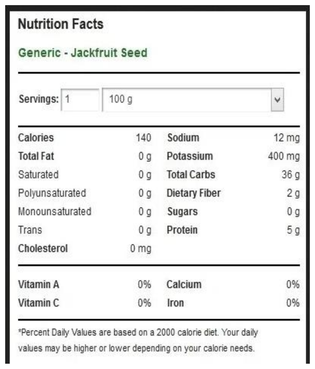
Conclusions

The study results suggest that incorporation of jackfruit seed flour will encourage waste utilization. The jackfruit seed flour has a great potential in development of different bakery products. The statistical analyses of sensory properties including colour, flavour, texture and overall acceptability of the muffins shows a decline as the level of substitution increases. The muffins prepared from the composite flour will have higher nutritional values as compared to the control sample. The utilization of jackfruit seed in the baking industry will open a new way for product market strategy. It can be concluded that value added muffins can be produced from the jackfruit seed flour.

Sr. no.	Particular	Value (% dry matter)
	Physicochemical properties	
1.	Moisture	6.09 ± 0.01
2.	Crude fat	1.27 ± 0.01
3.	Ash	2.70 ± 0.02
4.	Protein	13.50 ± 0.06
5.	Fiber	3.19 ± 0.01
6.	Carbohydrate	79.34 ± 0.06
7.	Energy (Kcal/100 g)	382.79 ± 1.20
8.	pH	5.78 ± 0.01
	Functional properties	
9.	Titratable acidity (as, lactic acid)	1.12 ± 0.03

Table 2. Some Physicochemical and functional properties of Jackfruit Seed flour

Source: Swami, Shrikant et al. "Jackfruit (Artocarpus heterophyllus): Biodiversity, Nutritional Contents, and Health", Chap, 2018/01/01



Nutrition Facts

Generic - Jackfruit Seed

Servings: 1 | 100 g

Calories	140	Sodium	12 mg
Total Fat	0 g	Potassium	400 mg
Saturated	0 g	Total Carbs	36 g
Polyunsaturated	0 g	Dietary Fiber	2 g
Monounsaturated	0 g	Sugars	0 g
Trans	0 g	Protein	5 g
Cholesterol	0 mg		
Vitamin A	0%	Calcium	0%
Vitamin C	0%	Iron	0%

*Percent Daily Values are based on a 2000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Figure 3. Nutritional facts of Jackfruit Seed.

References

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