A Study of the Preparation and Evaluation of Noodles from Black Rice

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ABSTRACT
This study looked at the effects of substituting different amounts of black rice flour for wheat flour on the qualitative traits of ready-made noodles. The findings showed that compared to wheat flour, the black rice (BR) type had greater levels of crude protein, crude fat, ash, and fiber. The greatest levels of the vitamin B complex group were found in black rice. According to the findings, Black rices is an excellent source of anthocyanin and antioxidant activity. Noodles were functionally evaluated and content of polyphenolics, flavonoids, and anthocyanin were improved compared to the control. Moreover, Black rice can be excellent ingredient to increase the nutritional value and antioxidant properties of noodles.

KEYWORDS: Black rice, noodles and Anthocyanin

1. INTRODUCTION

Black rice is a type of rice that belongs to the Oryza sativa L. species. And is used as a functional food because of the effectiveness to health. (Kitsada et al., 2013). Black rice is a good source of iron and phenolic compounds, which act as antioxidants and prevent diseases including cancer and cardiovascular disease (Sompong et al., 2011). Black rice is a reliable source of vitamin E, ensuring strong energy (Oikawa et al., 2015). Black rice provides more nutritional benefits than regular rice, including more protein with great biological value and minerals. Due to the potent antioxidant capabilities of the pigment anthocyanin, black rice gets its distinctive black-purple colour. In addition to being a great source of vitamins and low in fat, it also contains insoluble fiber (Oko et al., 2012 and American Culinary Federation Education Foundation 2016).

One of the most popular food consumed in the world is noodles. Consumption of instant noodles is rising globally as they become a dish with international recognition. Instant noodles are popular due to their taste, nutrition, safety, convenience, prolonged shelf-life, and low pricing (Neelam et al. 2014). Long, thin portions of food known as noodles are produced from a combination of flour, salt and water and are cooked in soup or boiling water (Parvez, 2009). Noodles have many consumers' benefits, but they also have some drawbacks because the majority of the nutrients are lost when wheat flour is refined. The objective is to investigate if black rice (BRF) may be added as a component in noodles.

The goal of the current research was to analyze the chemical components of black rice (BR) and determine whether it would be probability to make functional noodles out of black rice flour instead of wheat flour.
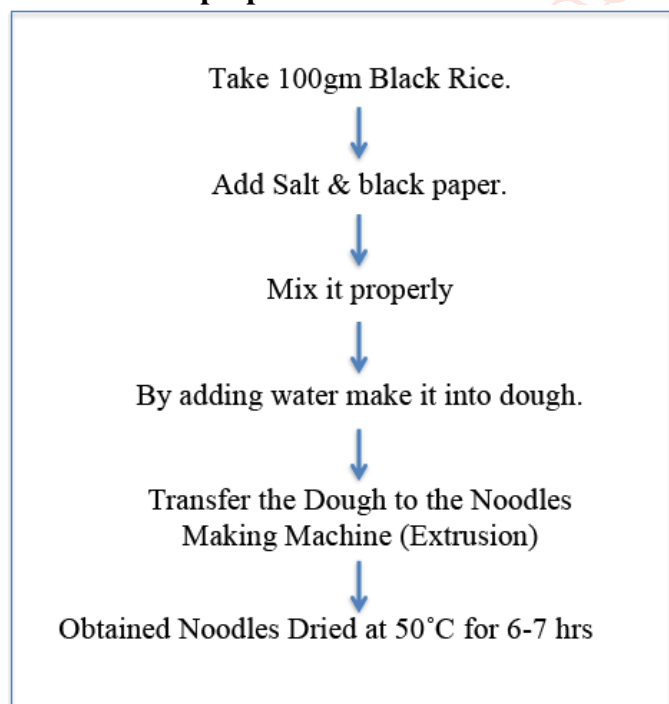
Figure 1 - Black Rice

2. Material and method:
2.1. Materials
Black rice (Oryza sativa) was obtained from cereals and pulses research center, Vadodara, Gujarat. In addition, Black paper powder and salt were purchased from a local market of Vadodara.

2.2. Noodles preparation

2.3. Preparation of black rice flour
Whole black rice was purified from impurities and grinding the grain into flour with mixer to obtain black rice flour (BRF). The resulted flour was stored in paper bags at cold storage for the further analysis. (5° ±2C)

2.4. Preparation of noodles
The basic step of noodles making is dough blending properly. For uniform blending, the respective flour blends were mixed in a planetary mixer for 5 min and passed through 50 mesh sieves. For the preparation of noodles, the flour blend (100g, all other ingredients are based on flour), salt (2%), black paper powder (1%) water (20-22%) were mixed in a planetary mixer for 10 min at 60 rpm. The resulting dough was covered with moist cloth and rested for 15 min for proper hydration. It was then passed through extruder equipped with a noodle die of 1.5 mm diameter to obtain noodles strands of about 20 cm. The fresh noodles were steamed for 10 min in a steam combi-oven at 95% RH and 100°C. Finally the noodles were dried for 6 hours under sun (doaa f. 2020).The fundamental ingredients of black rice noodles are black rice flour, black paper powder, salt and water. Black rice noodles A1 90% black rice flour and 10% black paper powder + salt. A2 95% black rice flour, 5% black paper powder + salt.

The cooled instant noodles were packed in polyethylene bags of 100g instant noodles then keep at a temperature -18°C for further analysis.

2.5. Proximate analysis:
Proximate composition of black rice noodles made from composite flour indicates that it contains good levels of protein, fiber, fat and antioxidants. 2 gm of samples were dried in an oven at to 105 °C until they reached a consistent weight to determine the moisture content. Moisture content was determined by loss while drying (8). 2 gm of sample were incinerated in a muffle oven for 12 hours at 550 °C to quantify the amount of ash(8). The crude fiber was identified through consecutive applications of sodium hydroxide and sulfuric acid(9). The residue that was left over after this process was completed was dried, weighed, and considered to represent the weight of crude fibre.

2.6. Sensory evaluation of standardized noodles
The 9-hedonic scale test was used to perform sensory analysis. The overall appearance, taste, texture, and intent to purchase. The mean scores for sensory of A1 and A2 samples are shown in Table 1.

15 panelists evaluated the control sample and samples of noodles prepared with black rice flour for their sensory qualities of colour, taste, texture, aroma, and overall acceptability using a 9-point Hedonic scale. Samples were rated on a scale of 1 to 9, with 9 being the most acceptable. The mean value was then calculated using the scores of the fifteen panelists.

2.7. Microbiological analysis
Total fungal count: All samples were stored at room temperature for a few days before being tested using Diliello's total fungal count method (10).

3. Results And Discussion
3.1. Sensory evaluation of noodles
A regular taste panel of 15 members from the Food Technology Department of the Faculty of applied sciences at parul University in Vadodara, GJ, India. Evaluated samples of noodles for their sensory

qualities. Using a 10-point rating system for flavor, odor, texture, appearance, colour, and general acceptance, noodles underwent sensory evaluation. The addition of black paper powder play an important role in higher overall acceptability of the finished products.

3.2. Proximate analysis of black rice noodles

The sample's composition was examined moisture, total ash, crude fiber, and protein and antioxidant activity by the method of oven drying, muffle oven, AOAC Method, kjehldal method and DPPH method. The obtained results are recorded in table 3.

3.3. Microbiological analysis

An index of the quality of food products is the total plate count of the microbial population. Sample discovered The total yeast and mould count, which was 500 cfu/gm, is acceptable.

Table 1 Different formulations of the noodles by various percentage of black rice flour and black paper powder

Treatment	A1	A2
Black rice flour	90gm	95gm
Black paper powder	6gm	3gm
Salt	4gm	2gm

Table 2 Mean Score of the Sensory Evaluation of Noodles

Sensory qualities	A1	A2
Colour	8	9
Texture	7	8
Taste	8	9
Aroma	9	8
Overall acceptance	8	9

Note. 9. Like extremely 8. Like very much 7. Like moderately 6. Like slightly 5. Neither like nor dislike 4. Dislike slightly 3. Dislike moderately 2. Dislike very much 1. Dislike extremely
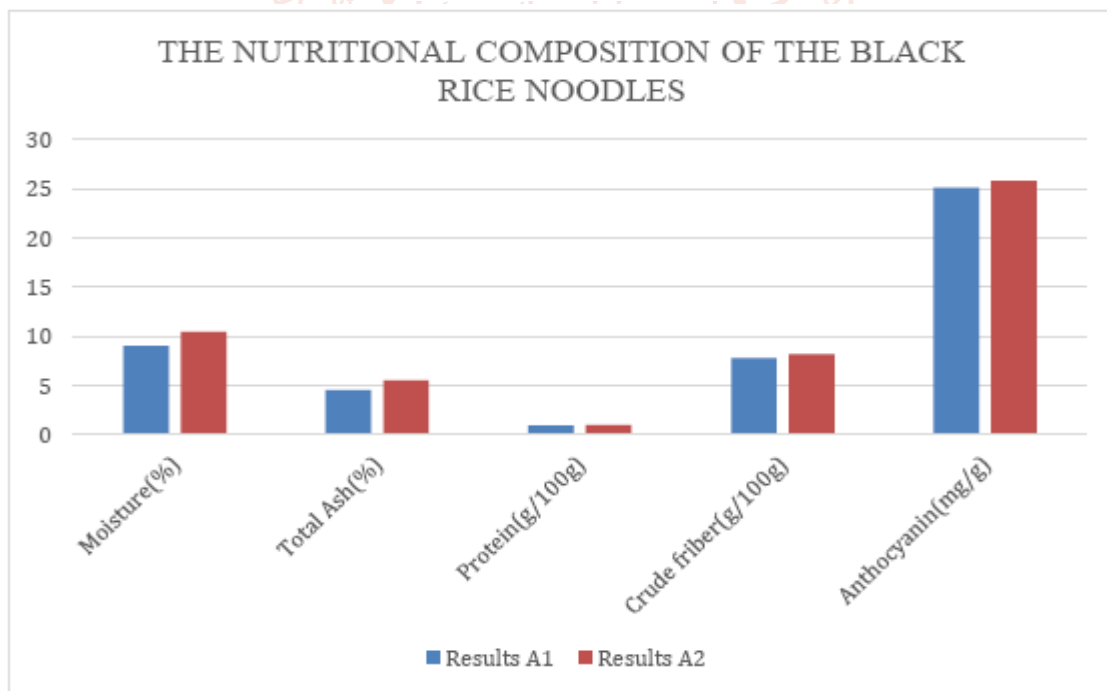
Table 3. The nutritional composition of the black rice noodles was analyzed using different method.

Parameters	Results	
	A1	A2
Moisture (%)	9.0	10.5
Total Ash (%)	4.52	5.58
Protein(g/100g)	0.93	1.02
Crude friber(g/100g)	7.80	8.20
Anthocyanin(mg/g)	25.1	25.8

Note: A1 and A2 are samples of black rice noodles

THE NUTRITIONAL COMPOSITION OF THE BLACK RICE NOODLES

Figure 2 – Noodles from Black Rice

4. Conclusion

These findings suggest that noodles made from black rice flour and anthocyanin has greater health advantages than noodles typically sold in provision stores. It is evident from the chemical properties that the black rice noodles have anticancer properties and naturally gluten free.

Compliance with ethical standards
Acknowledgments

Disclosure of conflict of interest

The authors declare that there is no conflict of interest.

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