PHYTOCHEMICAL, PROXIMATE AND MICROBIAL ANALYSIS OF BLACK RICE NOODLE

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Abstract –

Since ancient times, Asian populations have eaten noodles as a staple cuisine. It is a tasty, convenient, simple to prepare, and nutritious product that is now well-liked outside of Asia. The most common ingredients used to make rice noodles are flour, salt, water, and a few extras. In the presence of water and salt, rice flour is needed to create dough, which is then sheeted, compounded, steamed, and sliced to create noodles. The strands of noodles can be further processed (dried, fried, boiled) to create different varieties of noodles based on consumer preferences. Rice noodles don't contain gluten, hence its texture is less expansive and cohesive. Rice starches are partially gelatinized by steaming, which helps rice-based noodles somewhat compensate for the role of gluten. In this paper I have mentioned about phytochemical, proximate and microbial analysis of the product.

Keywords: Raw resources; processing; qualities of rice noodles, flour, black rice.

Introduction

Black rice is the native of the common rice variety (Oryza Sativa) it is used as functional food due to the effectiveness to health. Black rice is a rich source of Iron, Antioxidant including phenolic compounds which prevent illness and it is used for hospitalized patient. Noodles are made from simple ingredients including rice flour, salt, water it is the most popular food consumed throughout the world. Noodles are favored by consumers for ease of cooking, handling, transportations and their cost is affordable. In this study black rice bran was selected because of its high nutritional value and distribution of antioxidant compounds. Anthocyanins are the most commonly found in black rice which gives purple colour to the pericarp layer. Generally rice noodles are made from flour containing high amylose concentration (>21%),

which contributes to the gel network. It provides firm structure and desirable properties to noodle. Noodles are a wholesome dish that complies with international food safety regulations. Consumer demand for high-quality noodle products rises along with the growth of the Asia-Pacific economy. Next to cooked rice grain, rice noodles are the rice product that is most popular in Asia. Noodles can either be served as a soup noodle by boiling in broth or by frying and mixed with meats and veggies. Since rice proteins don't include gluten, they can't make continuous visco elastic dough. Therefore, pre-gelatinized rice flour is used to bond the remaining flour. The degree of pre-gelatinization is crucial in giving the strands of the noodles a desirable texture. Most often, rice During the extrusion process, the level of gelatinization is appropriately managed to build the desired binding power, while excessive gelatinization may cause handling issues. The two major methods for making rice noodles are sheeting the dough to create flat noodles and extruding the dough to create vermicelli. Typically, the functions, procedures, and desired end product of the raw ingredients for rice-based noodles are assessed. The pasting and physicochemical properties of rice flour made from various types of rice
determine its textural, culinary, and sensory qualities. The characteristics of noodles can also be influenced by the size of the flour particles. Noodles prepared from flour with reduced particle size, however, displayed excellent textural qualities. Similar to the larger particle size, the smaller particle size had the lowest gelatinization temperature but the highest water absorption index, hot paste viscosity, peak viscosity, and breakdown. However, the amount of fat present has no impact on the characteristics of the noodles.

Nutritional Composition -

75% of black rice is Carbohydrate, especially starch. It is also rich source of a class of dietary fiber resistant starch. Cellulose, hemicellulose and pectin and simple sugar(glucose, fructose).Black rice has more minerals such as Iron Calcium, Zinc, Copper, Magnesium, Potassium than refined white rice. Black rice has more nutritional attributes than white rice due to Vitamin A, E, B.

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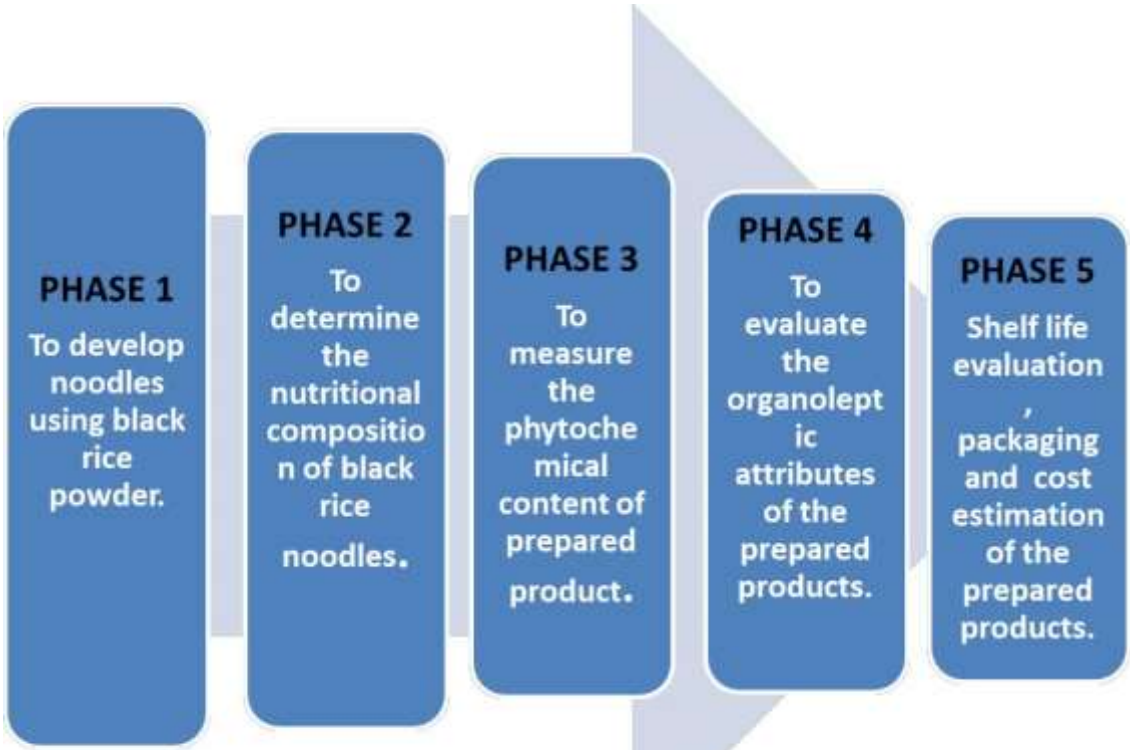
Study Design



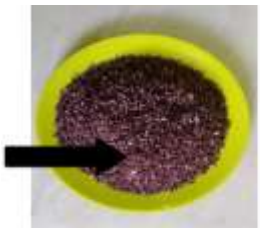
Material and Methods -

Along with finishing all of the studies, the preparation of black rice noodles was done in the Food Science & Technology lab at the Babasaheb Bhimrao Ambedkar University's School of Home Science's Department of Food and Nutrition.

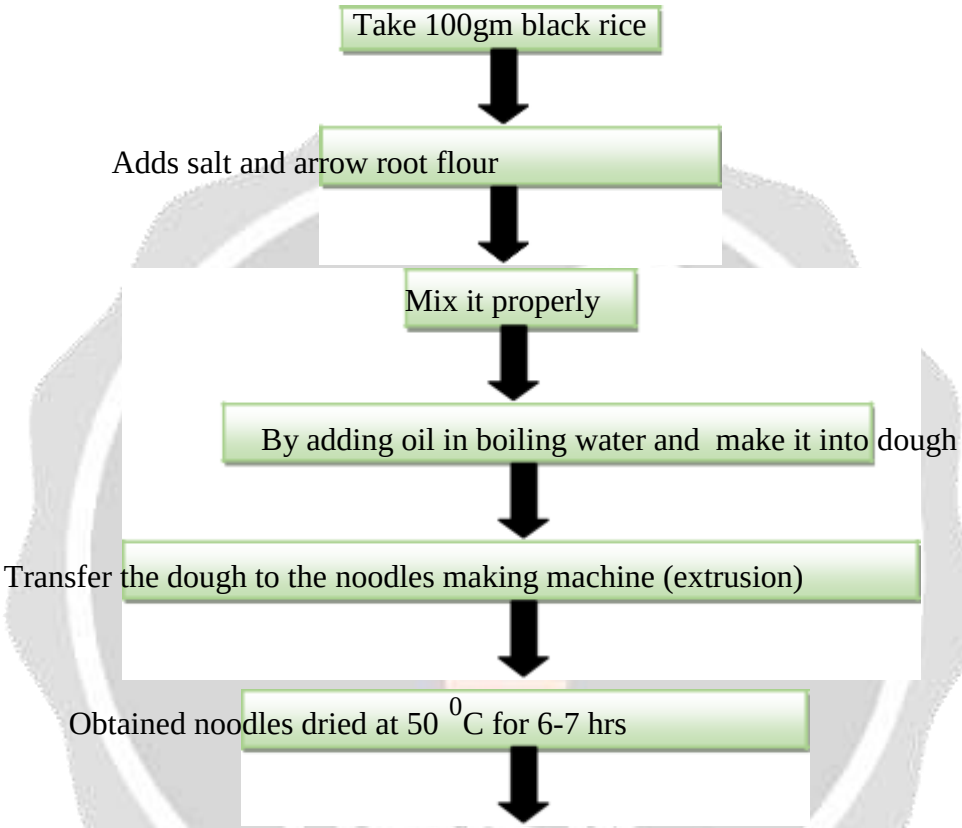
Materials-

Black rice is purplish colour rice mostly grown in North East (Assam). Black rice flour used to make noodles it gives fine colour and texture also. The main ingredients are Rice flour, Salt, arrow root flour, water and refined oil.

1. **Flow chart of black rice noodles**




Noodles Preparation



Phytochemical Qualitative Analysis

The plant extracts and methanolic and ethanolic aqueous solutions were assessed for the existence of the phytochemical analysis by using the following standard methods

- **Test for Tannins -**

10 ml of bromine water was added to the 0.5 g aqueous extract. Decoloration of bromine water showed the presence of tannins.

- **Test for Saponins**

5.0 ml of distilled water was mixed with aqueous crude plant extract in a test tube and it was mixed vigorously. The frothing was mixed with few drops of olive oil and mixed vigorously and the foam appearance showed the presence of saponins.

- **Tests for Flavonoids**

Shinoda Test. Pieces of magnesium ribbon and Hcl concentrated were mixed with aqueous crude plant extarct after few minutes and pink color showed the presence of flavonoid.

Alkaline Reagent Test. 2 ml of 2.0% NaOH mixture was mixed with aqueous plant crude extract; concentrated yellow color was produced, which became colorless when we added 2 drops of diluted acid to mixture. This result showed the presence of flavonoids.

- **Test for Terpenoid**

5gm sample +100 ml distilled water kept for 24 hrs then filtered ,2.5 ml of extract + 1ml chloroform + 1.5 ml conc.sulphuric acid .

Reddish brown colour indicates presence.

- **Alkaloid Test**
  2ml extract+Hager's reagent few drops gives yellow ppt.indicates presence of Alkaloid .

Dragondroff's Test

2ml extract +Dragondroff's reagent few drops showed orange ppt.

Orange ppt. indicates the presence of alkaloid **.**

Proximate Analysis of black rice noodles

Moisture

Weigh approximately 10 g of waffle premix into a pre-weighed Petri dish and place in a hot oven at 70°C for 6 hours. The dried residue was weighed after cooling in a desiccator to calculate the moisture content. The moisture content was calculated with the help of Eq.(1)

Procedure

- 10g sample was taken
- Placed in a petri plate
- Dried in a hot air oven for 24hrs

- Then final reading was taken

Formula:

$$\textbf{Moisture(\%)} = \frac{\textbf{(W1-W2) x 100}}{\textbf{W1}} \qquad \textit{(1)}$$

Where W1 = weight(g) of sample before drying

W2 = weight (g) of sample after drying

Ash Estimation using Muffle Furnace

- Place the crucible and lid in a muffle furnace at 550 °C overnight to completely burn away impurities on the surface of the crucible. Cool the crucible in a desiccator (30 min).
- Weigh the crucible and lid to three decimal places. Place approximately 5 g of the sample into the crucible.
- Heat the Bunsen over low heat with the lid half-closed. When no more smoke comes out, place the crucible and lid in the oven.
- Heat at 550 degrees Celsius overnight. Do not cover while heating. Cover the lid after heating sufficiently to prevent the puffy ash from flying away. Cool in a desiccator.
- When the sample turns gray, weigh the ash using the crucible and lid. If not, place the crucible and lid back in the oven for additional heating.
- The ash content of the sample was determined by using Eq(2)

Formula

Ash (%) = weight of ash/weight of sample *100

Fat:

Fat Estimation The fat estimated in sample was 2.73gm . According to the RDA daily intake required fat content per day is 44 to 71gm. After the sun drying process the content of fat decrease in very low amount, sun drying is the process by which nutrient content loss in very less amount. The obtained fat content of the products are sufficient to fulfil the one meal fat requirement.

Formula:

$$\textbf{Fat(\%)} = \textbf{Weight of fat x 100} \qquad \textit{(3)}$$

Soxhlet Apparatus

Protein estimation by Kjeldahl Method

Method:

- Add the sample (0.5-1.0 g) to the digestion flask.
- Add 5 g of Kjedahl catalyst and 200 ml of concentrated H2SO4.
- Prepare tubes with the above chemicals except blanks.
- Tilt the flask and heat gently until bubbling stops. Boiling will quickly erase the solution. Cool and carefully add 60ml distilled water.
- Immediately connect the flask to the condenser's dissolving flask by dipping the tip of the condenser into standard acid and dipping the receiver's indicator 5-7.
- Rotate the flask to thoroughly mix the contents.
- Then heat until all NH3 is distilled off. Remove the receiver, rinse the condenser tip, and titrate the excess distilled standard acid with NaOH standard solution.

Formula:

$$\textbf{Protein (\%)} = \frac{\textbf{(A-B) x N x 1.4007 x 6.25}}{\textbf{W}} \qquad \textbf{(4)}$$

Where

A = volume (ml)of 0.2 N HCl used sample titration

B = volume (ml) of).2 NHCl used in blank titration

N = Normality of HCl

W = weight (g) of sample

14.007 = atomic weight of nitrogen

6.25 = the protein nitrogen conversation factor for fish and its by products

Carbohydrates

The content of available carbohydrate was determined by difference i.e. . by subtracting from 100 the sum of values (per 100g) for moisture, protein, fat and ash.

Formula-

(%) Carbohydrates = 100 – (% protein + % fat +% ash +% moisture)

Microbial Analysis

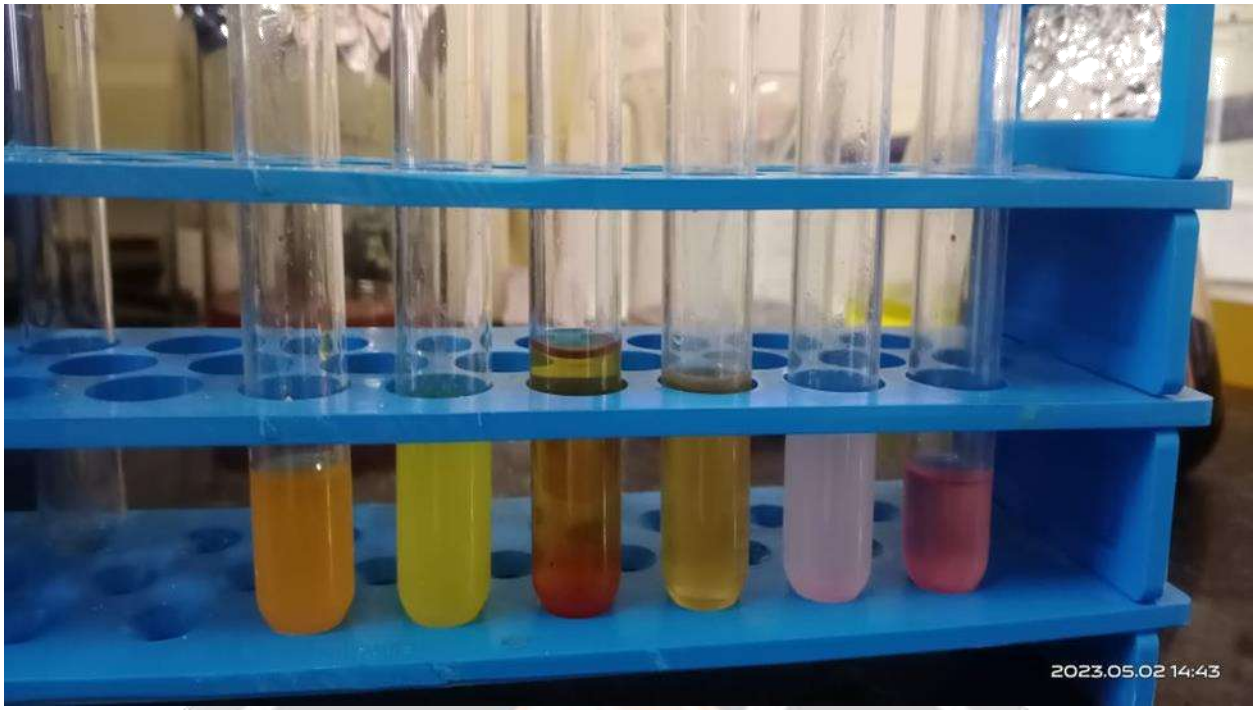
The medium was prepared by suspending 28 g of nutrient agar powder in 250 ml of distilled water. Dissolve the nutrient agar medium in distilled water by shaking gently. Autoclave the dissolved mixture at 121 °C and 15 psi for 15 min. After autoclaving the nutrient agar, allow to cool but do not harden. Pour nutrient agar onto each plate in laminar flow, place the plate on a sterile laminar flow surface, and turn on UV light in laminar flow until the agar hardens. After the serial dilution was done. I have selected T-4 and T-5 dilution factor for inoculation. Spreading was done equally all over the plate without damaging the solidified media. Cover the spreaded plate with their lid and put it by inverting them in the incubator at 37 degree C for incubation. Incubation was done for 24-48 hrs. After the incubation time is completed, colonies was counted manually by making quadrant and CFU was calculated with the help of Eq(6) which is given below-[6]

$$\text{CFU/ml} = \frac{\text{no. of colonies (whole plate)}}{\text{Volume of culture plate}} \times \text{dilution factor} \qquad (6)$$

CFU = Colony forming unit

RESULT & DISCUSSION

Phytochemical Analysis



Moisture Content Estimation

The moisture content of the sample was obtained 11.9%.

Ash Content Estimation

The ash content of the sample was obtained 0.1% .

Fat Estimation

The fat estimated in sample was 2.73 gm . According to the RDA daily intake required fat content per day . After the sun drying process the content of fat decrease in very low amount. Fat content needed to help the body to absorb the vitamin content like Vitamin A, vitamin E and vitamin D.

Protein Estimation

The protein content in sample was obtained 9.9 gm per 100gm of black rice .

Carbohydrate Estimation

The carbohydrate content was calculated in sample 34 gm .

Shelf life Estimation

The CFU count of black rice noodles sample was 182.

The CFU count was below 300, so it is not harmful for human consumption.

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