International Journal of Food Science and Nutrition
ISSN: 2455-4898; Impact Factor: RJIF 5.14
Received: 09-08-2019; Accepted: 11-09-2019
www.foodsciencejournal.com
Volume 4; Issue 6; November 2019; Page No. 42-45

Preparation of papad (papadum) using black rice flour, white rice flour & potato paste

Nongmaithem Mangaleima[1], Puneet Arora[2], Parimita[3]
[1] Research Scholar, Warner College of Dairy Technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India
[2, 3] Assistant Professor, Department of Warner College of Dairy Technology, Sam Higginbottom University of Agriculture, Technology and Sciences, Prayagraj, Uttar Pradesh, India

Abstract
Papad which is also called papadum is a thin Indian wafer like product which are usually prepared traditionally by drying in the sun. They come into different sizes and shapes usually made using the ingredients such as cereal flour, pulse flour, spice mixer and different vegetable juices for improving both organoleptic and nutritional characteristics.
The present investigation is "Preparation of papad (papadum) using black rice flour, white rice flour & potato paste" by standardizing recipe and study the nutritional composition and sensory characteristics. Four treatments were developed and the results indicate that carbohydrate % varies from {T_0 (83.91)-T_3 (83.38)}, protein {T_0 (8.52)-T_3 (8.03)}, fat {T_0 (2.53)-T_3 (1.53)}, ash {T_0 (1.02)-T_3 (2.03)}, TS {T_0 (95.98)-T_3 (94.98)} & moisture {T_0 (4.02)-T_3 (5.02)} in papad formulations. The most acceptable fortified papad was analysed for organoleptic analysis. The analysis of papad has colour & appearance {T_0 (8.39)-T_3 (7.65)}, flavour & taste {T_0 (8.30)-T_3 (7.46)}, body & texture {T_0 (8.35)-T_3 (7.12)} and overall acceptability {T_0 (8.35)-T_3 (7.41)} of product.

Keywords: papadum, rice, Papad, potato

1. Introduction
Papad is also known as Papadum. Papad is a thin Indian wafer, which can be refereed as a cracker or flat bread. Papads are traditional sun dried products which are very popular in India. It is a thin wafer-like product usually circular in shape, made from a variety of raw materials such as cereals or dhal (decorticated pulses) along with spices and salt. It is consumed in toasted or fried form (Shurpalekar *et al.* 1970).
Before making any papad, its dough is required to make. That dough contains salt and peanut oil and some flavors to make the special regional papad. Baking soda is also one of the main ingredients for making good papad. The dough is shaped into a thin, round flat bread and then dried (traditionally in the sun). Papad can be cooked by deep-frying, roasting over an open flame, toasting or microwaving.
Black rice (*Oryzasativa L.*) is glutinous rice with same species of white rice packed with high level of nutrients and mainly cultivated in Asia. The pericarp (outer part) of kernel of this rice colour is black due to a pigment known as anthocyanin, antioxidant. Black rice is also known as purple rice, forbidden rice, heaven rice, imperial rice and prized rice. Many people assume this rice as a panacea of many culinary diseases because of its high nutritive value and curative effect. This rice is supposed to enhance the longevity of life, hence it is also known as long life rice. This rice includes several varieties with a long history of cultivation in Southeast Asian countries such as China, India and Thailand (Kong *et al*. 2008).
In India, black rice is cultivated only in some areas of north east mainly in Manipur and in south India such as Tamil Nadu. In Manipur, mainly two varieties of aromatic black rice (*Poireitonchakhao* and *Chakhaoamubi*) are grown. The duration of both the varieties is 145 days and the plant height is approximately 120 cm. *Chakhao Poireiton*is characterized as sweet sticky purple rice and *Chakhaoamubi*is characterized as sweet sticky black rice.
The aromatic black rice of Manipur is different from the Chinese forbidden black rice. However, due to lack of documentation, people are not aware of importance of black rice in India. The aromatic black rice of Manipur is sticky rice and used for the community feasts as well as ceremonial purposes as delicacy. Black rice is traditionally used in *Shradha* ceremony as offering to God in some region of Manipur and also in festival like *Shivaratri*. It
is believed that *Chakhao*of Manipur came with the people of Manipur, particularly *Meitei*swhen they first settled on this land. *Chak* means rice and *ahaoba*means delicious and hence, *Chakhao* means delicious rice.
Potato*(Solanumtuberosum)* is fourth most important food crop worldwide (Hesam *et al.*, 2012).Potato is an ideal food crop because of its virtues like wide adaptability, flexibility of production and diverse range of human taste and preference. The changing life style, urbanization and increasing demand for fast foods have given a big boost to potato processing both in the developing and developed countries. Potato can be processed into an indigenous dehydrated product called papad ,which has a promising future due to its long shelf life and diverse uses.
Rice *(Oryzasativa)* is a dietary staple foods and one of the most important cereal crops, especially for people in Asia, but the consumption outside Asia has increased, recently (Orthoefer, 2005). It provides the bulk of daily calories for many companion animals and humans (Ryan, 2011). The glycemic index is one of the popular issues in the world, and

people are rethinking whether consume rice or not. Some study showed that rice consumption is related to the higher risk of diabetes mellitus (McKeown *et al*., 2002; Hu *et al*., 2002). The other studies showed the inverse one. In fact, rice has greater variability of the glycemic index depending on type, cooking method, etc. The unique taste of rice provides easy way to combine rice with the other food to achieve better taste and nutritional balance.

Materials and methods

The experimental studies were carried out in the Food tech lab I, Warner College of Dairy Technology, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad during Jan-June 2019.

Materials

Almost care should be taken in choosing the raw materials for the preparation of papad made from black rice flour, white rice flour and potato paste.

1. Black rice flour

Black rice of good quality was purchased from Manipur. The variety of black rice used for preparation of this papad is PoreitonChakhao.

2. White rice flour

Commercially available white rice flour in the market can be used.

3. Potato paste

Fresh Potato of medium size was purchased from the local market in Prayagraj. The variety used was Russet (starchy) which has rough brown skin and mealy flesh.

4. Baking soda

Baking soda also known as sodium bicarbonate has a vital role in preparation of papad as it contributes to the eating quality and texture of papad. It was purchased from the local market in Prayagraj.

5. Ajjwain

Ajjwain has been used as an ayurvedic medicine since ancient times and has various health benefits. Therefore ajjwain has been added to papad to enhance quality and it was purchased from the local market in Prayagraj.

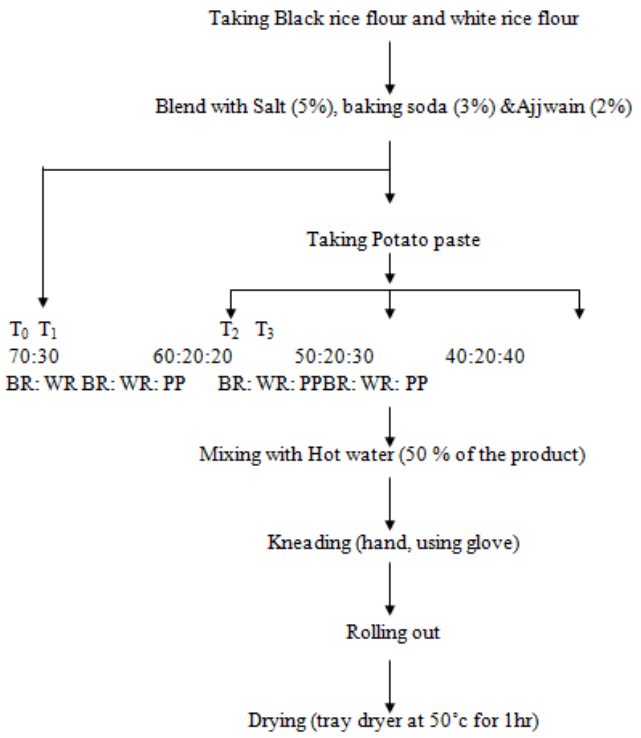
Treatment Combination

Table 1

Treatment	Blackrice Flour	White rice flour	Potato Paste
T_0	70	30	-
T_1	60	20	20
T_2	50	20	30
T_3	40	20	40

T_0-control prepared from 70% black rice flour and 30% white rice flour.
T_1-experimental sample prepared from 60% black rice flour, 20% white rice flour and 20% potato paste.
T_2-experimental sample prepared from 50% black rice flour, 20% white rice flour and 30% potato paste.
T_3-experimental sample prepared from 40% black rice flour, 20% white rice flour and 40% potato paste.

Preparation of Papad



***Note-** BR=Black rice, WR = White Rice, PP = Potato Paste Papad

Fig 1

Result and Discussion

The data collected on the different aspects were tabulated and analysed statistically using the method of analysis of variance and critical difference technique. The significant and non- significant differences observed have been analysed critically within and between the treatment combinations.

The analysed data is presented in this chapter under the following headings:

1. Chemical characteristics

a) In terms of Carbohydrate percentage in samples of different treatments and control, the highest mean Carbohydrate percentage was recorded in the sample of T_0 (83.91), T_1 (83.62), T_2 (83.41) followed by T_3 (83.38).
b) The Protein percentage in samples of different treatments and control, the highest mean Protein percentage was recorded in the sample of T_0 (8.52), T_1 (8.33), T_2 (8.14) followed by T_3 (8.03).
c) The Fat percentage in samples of different treatments and control, the highest mean Fat percentage was recorded in the sample of T_0 (2.53), T_1 (2.02), T_2 (1.83) followed by T_3 (1.53).
d) The Ash percentage in samples of different treatments and control, the highest mean Ash percentage was recorded in the sample of T_3 (2.03), T_2 (1.81), T_1 (1.51) followed by T_0 (1.02).
e) The Total solids percentage in samples of different treatments and control, the highest mean total solids percentage was recorded in the sample of T_0 (95.98), T_1 (95.49), T_2 (95.19) followed by T_3 (94.98).

2. In terms of Moisture percentage in samples of different treatments and control, the highest mean Moisture

percentage was recorded in the sample of T_3 (5.02), T_2 (4.81), T_1 (4.51) followed by T_0 (4.02).

3. Microbial characteristics

1) Yeast and Mould score in samples of different treatments and controls, the highest mean percentage was recorded in the sample T_1 (2.20), T_3 (2.00), T_0 (1.40) followed by T_2 (1.40).
2) Coli form test for control and experimental sample was 100%.It shows the absence of gram negative bacteria which means the strict hygienic practice was maintained during the procedure preparation.

4. Standard Plate Count score in samples of different treatments and controls, the highest mean percentage was recorded in the sample T_3 (4.40), T_1 (4.40), T_2 (4.00) followed by T_0 (3.80).

5. Organoleptic characteristics

1) The Colour and Appearance score in samples of different treatments and controls, the highest mean percentage was recorded in the sample $_1$ (8.67), T_0 (8.39), T_2 (7.99) followed by T_3 (7.65).
2) The Flavor and Taste score in samples of different treatments and controls, the highest mean percentage was recorded in the sample T_1 (8.70), T_0 (8.30), T_2 (7.64) followed by T_3 (7.46).
3) In terms of Body and Texture score in samples of different treatments and controls, the highest mean percentage was recorded in the sample T_1 (8.73), T_0 (8.35), T_2 (7.72) followed by T_3 (7.41).
4) The OverallAcceptability score in samples of different treatments and controls, the highest mean percentage was recorded in the sample T_1(8.09) followed by T_0(7.69), T_2(7.41) and T_3(6.85).

6. Estimated cost of production was Rs. 22.24/100g while for T_1 was Rs. 19.23/100g, T_2 was Rs. 16.419/100g and T_3 was Rs. 14.007/100g.

Table 1: Average data for different parameters of control and experiments (in percent)

Parameters	Score / Value based on mean value of different parameter of treatment				C.D. Value
Treatment	T_0	T_1	T_2	T_3	

1. Chemical Analysis

Table 2

Carbohydrate	83.91	83.62	83.41	83.38	0.047
Protein	8.52	8.33	8.14	8.03	0.03
Fat	2.53	2.02	1.83	1.53	0.015
Ash	1.02	1.51	1.81	2.03	0.022
T.S	95.98	95.49	95.19	94.98	0.021
Moisture	4.02	4.51	4.81	5.02	0.021

2. Rganoleptic Analysis

Table 3

Treatment	T_1	T_2	T_3	T_4	
Colour & Appearance	8.39	8.67	7.99	7.65	0.41
Flavour & Taste	8.30	8.70	7.64	7.46	0.51
Body & Texture	8.35	8.82	7.54	7.12	0.31
Overall Acceptability	8.35	8.73	7.72	7.41	0.33

3. Icrobial Analysis

Table 4

Treatment	T_1	T_2	T_3	T_4	
S.P.C ($\times 10^3$ cfu/gm)	1.40	2.20	1.40	2.00	1.794
Coli form	Nil	Nil	Nil	Nil	-
Yeast & Mould	3.80	4.40	4.00	4.40	0.955
Cost (Rs/kg)	22.24	19.23	16.419	14.007	

Acknowledgment

The author would like to thank advisor Er. PuneetArora Assistant Professor, WCDT, SHUATS, Allahabad, for providing proper guidance and all required facilities. I would also like to pay my plethora of thanks to my co-advisor Dr.Parimita Assistant Professor, WCDT, SHUATS, Allahabad for her dedication, cooperation and prolific encouragement in accomplishing my work.

Conclusion

On the basis of the results obtained during the study, it is concluded that black rice flour, white rice flour & potato paste can be successfully employed for the preparation of papad (papadum). Black rice, the most nutritious of all rice due to its high antioxidant content, dietary fiber, gluten free, rich in minerals, protein etc is used as the main ingredient of the experimental papad. Moreover, black rice has many therapeutic values like fighting inflammation, reducing strokes, detoxification, and helps to prevent diabetes. The data obtained on various parameters were statistically analysed.the highest protein content was found in treatment 1 i.e 8.52 and fat content was highest in treatment 1 i.e 2.53.Chemical evaluation show the papad prepared by using black rice flour, white rice flour & potato paste T_1 (Treatment 1) (60:20:20) was found to be more acceptable because of higher nutritional profile as well as it scored maximum for all sensory appeal.

Reference

1. BukyaAnil, Kudale Saurabh, Satish, Langhi Ajay Tukaram. Preparation and standardization of papad using urad flour, raw banana and sweet potato and its self-life studies. 2018; 10(3):66158-66161.
2. Kang MY, Kim JH, Rico CW, Nam SH. A comparative study on the physicochemical characteristics of black rice varieties. Int. J. Food properties. 2011; 14:1241-1254
3. Laokuldilok T, Surawang S, Klinhom J. Effect of milling on the color, nutritional properties, and antioxidant contents of glutinous black rice. Cereal Chem. 2013; 90(6):554-557.

4. Math, RG, Velu V, Nagender A, Rao DG. Effect of frying conditions on moisture, fat, and density of papad. J. Food Eng. 2014; 64:429–434.
5. Yodmane S, Karrila TT, Pakdeechanuan P. Physical, chemical and antioxidant properties of pigmented rice grown in Southern Thailand. Int. Food Res J. 2011; 18(3):901-906.
6. Velu V, Balaswamy K, Nagender A, Rao DG. Effect of various ingredients and additives on papads. Foodservice Res Int. 2004; 15:78–88.