

# Nutraceutical Potential And Sensory Evaluation Of Papad Prepared From Seeds Powder

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**Abstract** — This study, focused on a healthy snack papad. Papad is a popular Indian traditional snack prepared from different legumes and cereals. Papads were prepared from green gram with the incorporation of *Cassia fistula* and *Albizia lebbek* seed's powder at different ratio. Three different variants of papads were prepared using (V<sub>1</sub> - 2, V<sub>2</sub> - 4 and V<sub>3</sub> - 6%) seed's powder and other ingredients with control. The papads were analyzed for sensory evaluation, proximate composition, phytochemical analysis and antioxidant activity. The sensory evaluation showed that V<sub>1</sub> was highly acceptable. All proximate values of variants were found to be remarkable. All the phytochemicals were present in variants along with control. Further, an increased antioxidant capacity (DPPH) and the high IC<sub>50</sub> value were observed in all variants. Incorporation of seeds powder is improved nutritional quality as well as health promoting properties in prepared papas.

**Keywords-** *Cassia fistula*, *Albizia lebbek*, proximate composition, phytochemical, DPPH

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## I. INTRODUCTION

Papad is South Asian cuisine and consumed worldwide. The different type of papad varies from one to another culture. Papads are served with the meal and also works as snacks. It can be eaten with various toppings. Mostly the papads are prepared from pulses, cereals and some are also made from fruits and vegetables like potatoes and bananas. Black gram dhal papad is largest selling papad in all markets. The demand of papad is rising very quickly so, there is the largest scope to introduce a variety of papad with healthy incorporation at low cost and maximize the utilization of uncommon seeds and catch the taste of a new generation (1-2).

Plants, seeds, and herbs are present that have many health properties. Some non conventional seeds are not known by the population but they have many beneficial properties such as antioxidants, nutrient dense, anti-diabetic and anti-obesity also.

*Cassia fistula* and *Albizia lebbek* belongs to the family *Fabaceae* are semi-wild tree seeds. These seeds have high nutritive value and used to treat diarrhea, skin disorder, abdominal pain, leprosy, cancer, obesity, fever, arthritis, asthma, burns, anxiety, depression, insomnia and also good source of phytochemicals and antioxidants. These are the native plant of India *Cassia fistula* is also known as golden shower (2-6). *Albizia lebbek* is known as Siris and firewood these seeds also possess antipyretic, antidiabetic, analgesic, estrogenic, and anti-inflammatory (7-9). This study focused on the preparation of healthy snack papad and its acceptability evaluation.

## II. METHODOLOGY

### A. Material and Methods

Seed's powders (*Cassia fistula* and *Albizia lebbek*) were collected from Neeraj Traders in Jhansi U.P. and stored in auto seal pouches until the time of food product development. Both seed's powder (*Cassia fistula* and *Albizia lebbek*) were taken at the same ratio 10:10 mix well and then use for product development.

The healthy handmade papads were developed incorporating seed's powder in each variant ( $V_1, V_2, V_3$ ) at different ratio and control papad was purchased from market.

### B. Papad preparation

The preparation of papad consists of dough making using pulse flour (Green gram dhal), salt and spices. The dough is kneaded made into small balls and pressed into 1 mm thickness using the above papad press. The pressed circular papad is dried to 14-15% moisture level. The above process can easily execute at home as it involves low cost. Table I and II show the proper recipe of papad.

Table I  
Standard Recipe for Papad Preparation

Ingredients	Amount (g)
Green gram	60
Fenugreek leaves	20
Mint leaves	4
Black pepper	5
Salt	5
Asaefotida	2
Papad khar	2.5
Olive oil	2

The composition of control recipe mentioned in Table I. The variants are prepared with same composition as control only seed's powders were incorporated as mentioned in Table II.

Table II  
Composition of Papad Incorporated by Seed's Powder (*Cassia fistula* and *Albizia lebbek*)

Variants	Green gram	Fenugreek leaves	Mint	Black pepper	salt	Asaefotida	Papad khar	Olive oil	Seeds powder
$V_1$	60	20	4	5	5	2	2.5	2	2
$V_2$	60	20	4	5	5	2	2.5	2	4
$V_3$	60	20	4	5	5	2	2.5	2	6

### C. Sensory evaluation

Sensory evaluation of papads with all attributes like color, taste, flavor, texture and overall acceptability were evaluated by semi-trained panel member using 9-point hedonic scale. The panelist gives scores 9-1 for the product ranging from like extremely to dislike extremely finding out the most suitable composition of the papads (10).

### D. Proximate composition

Moisture content was determined using the hot air oven by drying the sample at 105°C until a constant weight was obtained (11). Ash content was determined by muffle furnace at a temperature of 550°C. Protein content was determined by the Kjeldahl method. Crude fat analyzed by Soxhlet method using petroleum ether as a solvent. Crude fiber analyzed by acid alkali digestion method. Total carbohydrate (CHO) was determined by subtracting the sum of fat, protein, ash and moisture content from 100 (12, 13).

### E. Mineral analysis

Minerals were determined after the dried powder samples. Samples aliquot were used for the determination of Calcium and Iron content. Calcium and iron were determined by atomic absorption spectrophotometric method (14).

### F. Phytochemical screening

#### Preparation of extract:

The dried papad powder was successively extracted with water for 72 hours each. The obtained extract was stored in a refrigerator at 4°C until used. The extract was screened for the presence or absence of alkaloid, glycosides, flavonoids, steroids and terpenoids (15, 16) by standard methods.

### G. Antioxidant analysis

#### DPPH radicals scavenging assay:

The DPPH free radical scavenging activity assay was based on a modified method of Brand-Williams (17).

G Statistical analysis: Data were presented as mean  $\pm$  standard deviation.

## III. RESULTS AND DISCUSSION

### A. Sensory evaluation

Papads were statically analyzed using mean and standard deviation. Variant 1 ( $V_1$ ) has better scores as compared to  $V_2$  and  $V_3$ . Control and  $V_1$  (2% seed's powder) papad were found to be desirable whereas  $V_2$  (4%) and  $V_3$  (6%) papad were found to be least desirable as depicted in Table III.

So the papad with 2% seed's powder ( $V_1$ ) level of supplementation was found to be most acceptable by the panel member.

According to the present results depicted that developed papads are acceptable. Acceptability of papads in terms sensory attributes suggests suitability of papads with seed's powder.

Another study was conducted in which papads were developed by using *Moringa oleifera* leaves and flowers powder, the results of this study were different from our study in which all the variants of papad were acceptable (18).

Table III  
Sensory Evaluation of Papad Prepared from Different Level of Seed's Powder

ATTRIBUTES	Control	Variant $_1$	Variant $_2$	Variant $_3$
Appearance	8.8 $\pm$ 0.41	8.3 $\pm$ 0.61	8.2 $\pm$ 0.88	7.8 $\pm$ 0.74
Color	8.5 $\pm$ 0.63	8.3 $\pm$ 0.48	8.0 $\pm$ 0.59	8.1 $\pm$ 0.74
Flavor	8.3 $\pm$ 0.81	8.1 $\pm$ 0.74	7.6 $\pm$ 0.81	7.8 $\pm$ 0.86
Taste	8.4 $\pm$ 0.73	8.4 $\pm$ 0.63	7.9 $\pm$ 0.96	7.5 $\pm$ 0.74
After taste	8.5 $\pm$ 0.51	8.2 $\pm$ 0.56	7.9 $\pm$ 0.96	7.6 $\pm$ 0.73
Texture	8.0 $\pm$ 0.79	8.6 $\pm$ 0.48	7.9 $\pm$ 0.88	7.8 $\pm$ 0.94
Overall Acceptability	8.6 $\pm$ 0.63	8.3 $\pm$ 0.48	8.0 $\pm$ 0.70	7.8 $\pm$ 0.67

### B. Proximate composition

After the sensory evaluations, the three different type of papad were subjected to nutrient analysis. The moisture content of control papad was low (12.9g/100g) as compared to other variants. The moisture content of seed's powder papad was high in the comparison of papad prepared from wheat legume composite flour that is (7.82-10.10 5g/100g). Ash content was high in control (11.5g/100g) in the comparison of variants it ranged between (3.66-5.12g/100g) Table IV. Protein content was revealed that control papad was showed the low protein content (3.00g/100g) in the comparison of variants (16.8-19.2g/100g). Wheat legume composite flour papad shows the more or less same protein content (18.81-21.22g/100g) as compared to our study. Fat content was high in variants as compared to control. The fat content in mint leave papad was more or less same in amount range between (2.6-3.2g/100g). Fiber content was more or less same in control and variants but high in  $V_3$  (3.4g/100g). The fiber content in mint leave papad was low as compared to our study. CHO was high in variants as compared to control, wheat legume composite flour papad shows high amount of CHO (54.87-56.23 g/100g) as compared to our study.

Calcium and iron content were higher in all variants as compared to control. Wheat legume composite flour papad shows a low amount of calcium (61.99-68.11g/100g) and iron (4.81-5.31g/100g) as compared to our study. All the samples were nutritionally high-quality as well as acceptable and calcium was increased remarkably (19, 20).

Table IV  
Proximate Composition of Papad Prepared from Seed's Powder

Nutrients (g/100g)	Control	Variante 1	Variante 2	Variante 3
Moisture	12.9±0.01	15.7±0.11	16.6±0.11	17.4±0.04
Ash	11.5±0.00	3.6±0.27	4.8±0.64	5.1±0.63
Fat	0.00±0.00	2.4±0.15	2.5±0.18	3.0±0.56
Fiber	2.00±0.00	2.1±0.09	2.0±0.02	3.4±0.54
Protein	3.00±0.00	16.8±0.10	18.4±0.54	19.2±0.78
CHO	7.00±0.00	36.1±0.44	40.9±0.03	41.9±1.00
Calcium(mg/100g)	2.00±0.00	116.4±0.78	124.4±1.36	137.6±2.84
Iron (mg/100g)	8.00±0.00	10.0±0.06	11.8±0.08	12.3±0.37

### C. Phytochemical Analysis

The results of the phytochemicals show the presence of alkaloids, glycosides, steroids, terpenoids, and flavonoids in aqueous extract of papads. Phytochemicals are very important for the treatment of various diseases. Phytochemicals are also responsible for the presence of many compounds in plants such as antimicrobial, antioxidants and anti-inflammatory (21, 22). Phytochemicals screening were done to identify the classes of compound in the extracts. The results of the phytochemicals screening of seed's powder papad on aqueous extract were given in table V.

Table V  
Phytochemical Analysis on Aqueous Extract of Papad Prepared from Seed's Powder

Phytochemical Screening	Control	Variante 1	Variante 2	Variante 3
Alkaloids	+	+	+	+
Glycosides	+	+	+	+
Steroids	+	+	+	+
Terpenoids	+	+	+	+
Flavonoids	+	+	+	+

### D. Antioxidant activity

#### *DPPH free radical scavenging activity:*

The stable DPPH radical model is a widely used, relatively quick method for the evaluation of free radical scavenging activity. DPPH is a stable free radical and accept an electron or hydrogen radical to become a stable diamagnetic molecule. Antioxidants on interaction with DPPH both transfer electron or hydrogen atom to DPPH and thus neutralizing its free radical character and convert it to DPPH and the degree of discoloration indicates the scavenging activity of drug. The reduction capacity of DPPH radical is determined by the decrease in its absorbance at 517nm induced by antioxidants. The decrease in absorbance of DPPH radical caused by antioxidants because of the reaction between antioxidants molecules and radical progress which results in the scavenging of the radical by hydrogen donation. It is visually noticeable as a change in color from purple to yellow. Hence, DPPH is usually used as a substance to evaluate the antioxidant activity (43). The DPPH free radical was scavenged of seed's papad at different concentrations analysed in aqueous extract. Fig I Shows the DPPH radical scavenging activity of control and developed papads extracts, respectively. The prepared papads showed highest DPPH scavenging activity as compared with control papads.

The values for percent inhibition concentration of 20 $\mu$ g/ml, 40 $\mu$ g/ml, 60 $\mu$ g/ml, 80 $\mu$ g/ml and 100 $\mu$ g/ml. The IC<sub>50</sub> value of the investigated papad extracts were control papad 1.6 $\mu$ g/ml, V<sub>1</sub>– 1.7  $\mu$ g/ml, V<sub>2</sub>– 2.1  $\mu$ mg/ml, V<sub>3</sub>– 1.9  $\mu$ g/ml. The aqueous extracts of the prepared papad shows the high free radical scavenging activity as compared to control.

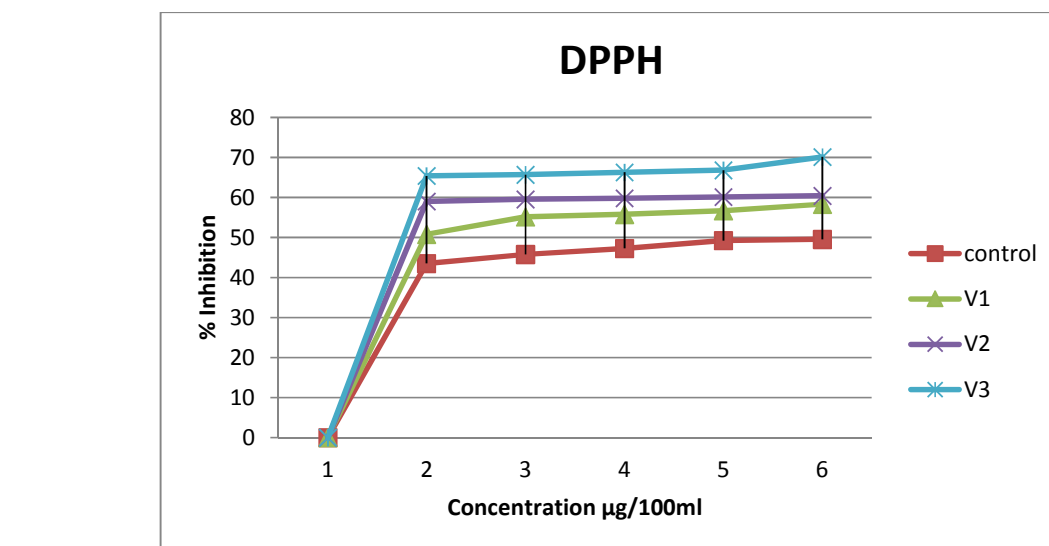


Fig I DPPH Free Radical Scavenging Activity of Papad

## IV. CONCLUSION

The plant's foods are often neglected by the Indian society so we developed a food product which is nutritious and healthy to consume. The *Cassia fistula* and *Albizia lebecke* seeds are rich in antioxidants, protein, calcium and many other nutrients. The papads can be consumed by any age group of the society. It is a low-cost product and affordable by the weaker sections of the society. Incorporation of these seed's in papad also improved protein and mineral content. Thus seed's enhances the nutraceutical potential of traditional snack papad and it taken as healthy snack.

## ACKNOWLEDGE

The authors are grateful to the Banasthali University, Rajasthan, Department of Food Science and Nutrition for providing lab facilities and valuable guidance.

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