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Formulation and organoleptic evaluation of papad prepared with incorporation of garden cress seed powder (*Lepidium sativum* L.)

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Abstract

This present work was undertaken to study formulation and organoleptic evaluation of papad incorporated with garden cress seed powder. The formulation for preparation of papad was carried out by using garden cress seed powder and black gram flour at different proportions viz., 100:00, 90:10, 80:20 and 70:30 respectively. Further, prepared papad were toasted and fried which was subjected for organoleptic evaluation by using 9 point hedonic scale. Results revealed that sample containing 90:10 both toasted and fried received highest sensory score (8.6) and was found superior followed by sample 80:20 compared to other samples. It was observed that there was significant variation found among the treatments. Overall, it can be concluded that supplementation of garden cress seed powder upto 20% in preparation of papad with good sensory attributes and nutritional value can be prepared.

Keywords: garden cress seed, black gram flour, papad, organoleptic evaluation

Introduction

Garden cress (*Lepidium sativum*) is an annual herb, belonging to *Brassicaceae* family that is native to Egypt and West Asia but is widely cultivated in hot temperate climates throughout the world for various culinary and medicinal uses (Malleshi and Guo, 2004) [1]. Garden cress is commonly referred to as 'Aliv' in Marathi, 'Halim' in Hindi, and 'Asali' in Malayalam (Rahman, 2004) [2].

Garden cress seeds, known as Halim in Hindi are loaded with nutrition. It is an important source of iron, folic acid, calcium, vitamins C, E and A. It is a rich source of iron 'containing 100 mg iron/100g. Garden cress seeds are high in calories. It has about 454 kcal and 33 gram of carbohydrate per 100 gram with a protein content of 25.3grams. It is often given postpartum to lactating mothers. It has low fat of 24.5 g, when compared with other nuts and oilseeds. The garden cress is important source of iron containing 100 mg iron per 100 g. Minerals like calcium, phosphorus (Balasubramanian, 2009) [3].

Garden cress seed though an oilseed is abundant in all nutrients. Garden cress oil (GCO) has a balanced amount of polyunsaturated fatty acids (PUFA) (46.8%) and monounsaturated fatty acids (MUFA) (37.6%) and also contains natural antioxidants viz., tocopherols and carotenoids which protect the oil from rancidity. Garden cress seeds are very high in iron and folic acid content. These seeds are used as herbal medicine to treat iron deficiency anaemia, because 100g of garden cress seed provide 100 mg. of iron. Iron is important for growth, brain development and the immune system, however it is commonly deficient or sub optimal in both children and adolescents (Gigi and Rashmi, 2014) [4]. Consumption of garden cress seed with high iron intake can be a ideal solution to overcome the Iron Deficiency Anemia (IDA) (Srilakshmi, 2010) [5].

The medicinal importance of garden cress seeds was known to Arab, Albania, Serbia, Greece, India etc. as rubifacient, galactagogue, emmenagogue, laxative, tonic, aphrodisiac and diuretic. They are used as poultices for hurts and sprains. The seeds have been used as rapid bone fracture healing. The seeds are also used in the treatment of diarrhoea, respiratory disturbances, cough, bleeding piles and to enhance sexual desire (Sarkar *et. al.*, 2014) [6].

Black gram (*Vigna mungo* L.) belongs to family *Fabaceae* sub family *papilionaceae*, commonly known as Urad in India is a highly valued pulse which contributes a wonderful taste to South India dish like 'Vada' and 'Dal makhni' of North India and is being grown as one of the principle pulse crop (Sharon *et. al.*, 2015) [7]. In Madhya Pradesh it occupies an area of 0.64 Mha with the production and productivity of 0.26 MT and 413 kg/ha respectively. In India black gram is grown in 3.11 Mha area with total production of 1.90MT and average productivity is 642 kg/ha (Anonymous 2013) [8].

Papads from split black gram are commonly available. It is prepared from cereals, legumes and combinations thereof with addition of spices, salts and alkaline additives. Papads prepared from rice, black gram, green gram, sago, potato, and sorghum are quite popular all over world (Kamat, *et al.*, 2009) [9].

Papad is a delicious traditional Indian snack food used as an accompaniment with meals and snacks and croutons in soups. In recent years, it has gained recognition as India's unique contribution to international menu. Papads have crunchy wafer-like taste and are normally consumed after roasting or frying. The papad industry in India is predominantly a cottage industry and is mainly started for women empowerment and social welfare. (Awalgaonkar *et al.*, 2015) [10].

Material and Methods

Raw materials

The present study was carried out in the department of food chemistry and nutrition, Vasantnao Naik Marathwada Krishi Vidyapeeth, Parbhani, Maharashtra. The study was aimed to develop product prepared from combination of gardencreess seed and black gram split. The raw material were procured from local market of Parbhani such as gardencreess seed, black gram split, black pepper powder, edible common salt, edible oil, papadkhar, compound asafetida etc. the raw material were cleaned and made free from husk and other foreign matters.

Organoleptic evaluation of papad

Organoleptic evaluation of papad for colour and appearance, flavour, texture, after taste and overall acceptability was carried out by using standard method of Amerine *et al.*, (1965) [11]. For this 10 semi-trained judges were used and 1 to 9 point hedonic scale was used for rating the quality of the gardencreess flour papad. The mean of ten judges was considered for evaluating the quality.

Methods

Standardization of formula (ingredients in g/100 gm) for preparation of gardencreess flour incorporated papad

For standardization of formula various combinations were used and the best one selected for further utilization. Gardencreess flour and black gram flour was blended with ingredients salt, papadkhar, asafoetida, black pepper, water and made dough. This dough was utilized in the preparation of papads. All the standardized ingredients were kept constant throughout all treatments.

Table. 1: Standardization of Formula (ingredients g/100 gm) for preparation of gardencreess seed flour papad

Ingredients	Treatments			
	T0	T1	T2	T3
Black gram	100 g	90 g	80 g	70 g
Gardencreess powder	0 g	10 g	20 g	30 g
Black pepper powder	0.5 g	0.5 g	0.5 g	0.5 g
Edible common salt	0.6 g	0.6 g	0.6 g	0.6 g
Compound Asafoetida	0.5 g	0.5 g	0.5 g	0.5 g
Edible oil	15 g	15 g	15 g	15 g
Papadkhar	4.5 g	4.5 g	4.5 g	4.5 g
Water	50 ml	50 ml	50 ml	50 ml

Preparation of dough and papads

Gardencreess seed and black gram cleaned and ground in to flour then sieved to 60 mesh sieve and add ingredients (papdkhar + salt + asafoetida + black pepper). Then mixed flour in boiling water, stirred well, mixed into smooth dough,

divided dough into small portion (10g each ball). Then papad were made and allow to dry in room temperature for 6-8 hrs. After that papads dried at room temperature, packed in plastic bags and stored at room temperature for further study. Market sample papads of finger millet and black gram were used as a control.

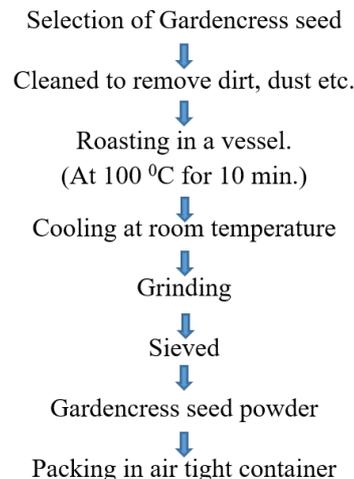


Fig 1: Preparation of gardencreess seed powder (Kaur and Sharma, 2015) [12].

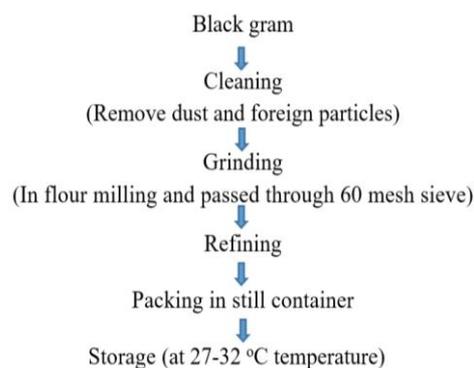


Fig 2: Preparation of black gram flour

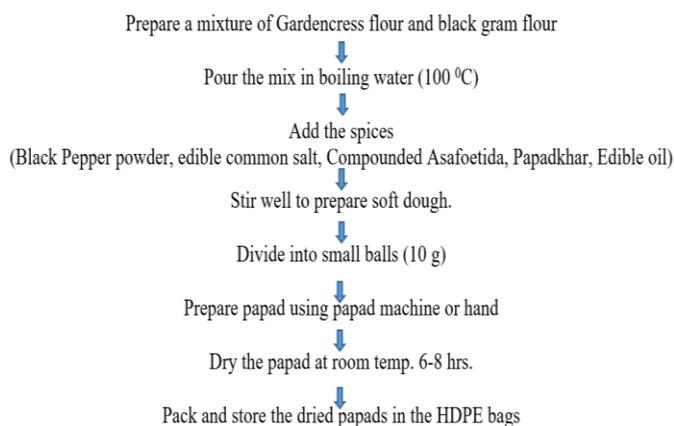


Fig 3: Preparation of Papad: (Siddique *et al.*, 2015) [13].

Results and Discussion

Sensory evaluation of papad

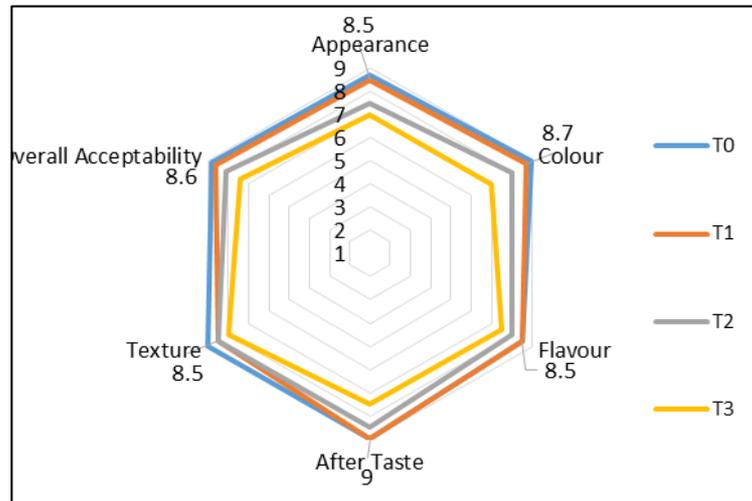
Data pertaining to sensory evaluation of fried and roasted papad with respect to appearance, colour, flavour, after taste, texture and overall acceptability were carried out. Accordingly, results obtained are depicted in table. 2 and Table. 3 respectively.

Table 2: Mean sensory score values for the garden cress seed powder papad (Toasted).

Samples	Appearance	Colour	Flavour	After Taste	Texture	Overall Acceptability
T0	8.7	9	8.5	9	9	8.8
T1	8.5	8.7	8.5	9	8.5	8.6
T2	7.5	8.0	8.0	8.5	8.5	8.1
T3	7.0	7.0	7.5	7.5	8.0	7.4
SE ±	0.154	0.152	0.179	0.114	0.218	0.114
CD at 5%	0.453	0.446	0.525	0.336	0.642	0.336

*Each value is average of three determinations

Where, T0-(100:00), T1-(90:10), T2-(80:20) and T3-(70:30).

**Fig 1:** Sensory evaluation of garden cress seed powder papad (Toasted)

Data indicated in above table.2 showed that toasted papad prepared with 90:10 garden cress seed to black gram received highest sensory score (i.e., 8.6) in case of all sensory attributes followed by papad having 80:20 scored (i.e., 8.1)

compared to rest of the samples. Statistically, sample T1 was varied significantly over rest of treatments whereas T0 and T1 was statistically at par with each other.

Table. 3: Mean sensory score values for the garden cress seed powder papad (Fried).

Samples	Appearance	Colour	Flavour	After Taste	Texture	Overall Acceptability
T0	8.8	9	8.7	9	9	8.9
T1	8.6	8.4	8.5	9	8.5	8.6
T2	7.2	8.3	8.1	8.2	8.5	8.0
T3	6.9	7.1	7.1	7.2	7.9	7.2
SE ±	0.040	0.056	0.103	0.084	0.066	0.128
CD at 5%	0.119	0.165	0.303	0.246	0.195	0.377

*Each value is average of three determinations

Where, T0-(100:00), T1-(90:10), T2-(80:20) and T3-(70:30).

It can be observed from Table.3 that fried papad having 90:10 garden cress seed to black gram was superior followed by sample having 80:20 respectively. It was revealed from the results that sample T1 received highest score (8.6) followed by sample T2 (8.0) whereas sample T2 and T3 reported lowest score for overall acceptability. It could be concluded that papad can be prepared with addition of 10% garden cress seed was highly acceptable followed by 20% garden cress seed with better sensory qualities but beyond 20% level there was negative impact on qualities of papad specially in case of colour and after taste due to alkaloid content which shown to have bitter properties.

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