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## Standardization of process for preparation of Indian heritage food *Sandga* using pulses and ash gourd

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**Abstract**

Indian Heritage Foods have occupied unique place in the dietary practices of Indian population and are known for their unique flavour, texture and taste characteristics around the globe. In present investigation, studies were undertaken to standardize the recipe, process parameter for the preparation of *sandga* (a dried vegetable product prepared from pulses bengal gram, green gram, black gram, ash gourd with different spices). Four different combinations of ash gourd and pulses were prepared and evaluated for sensorial and nutritional profile. The production process for *Sandga* is also standardized. The results revealed that *Sandga* could results in best organoleptic response when dried at the temperature of 70°C. Adding of 30% ash gourd and 70% pulses flour are used in the product *sandga* gave the best overall sensory acceptability.

**Keyword:** Bengal gram, Green gram, Black gram, spices, process standardization, sensorial profile, *Sandga*.

**1. Introduction**

Heritage foods play an important role in local identity, consumer behaviour, the transfer of cultural heritage for future generations, and the interaction of this heritage with the rest of the world. In many countries, the promotion and protection of traditional food is directed through quality, agricultural and special policies. In the era of globalization of the population and international food trading, health conscious citizens around the globe will benefit from the wealth of knowledge on traditional Indian and health foods of Indian origin. Indian traditional foods are also recognized as functional foods because of the presence of functional components such as body-healing chemicals, antioxidants, dietary fibers, and probiotics.

Pulses belong to the family *leguminosae*. The family *leguminosae* is made up of many species which are cultivated all over the world (Rubatzky and Yamaguchi, 1997). The term pulses cover all those grown for their dried seeds (COPR, 1981). Pulses have a variety of functions. The use of pulses range from their forming a staple diet to their being used as condiments, milk, cheese and snacks (Reddy *et al.*, 1986; Uzogara and Ofuya, 1992) [11].

Pulses are grown and used for food in nearly all the temperate and tropical areas of the world. Pulses are important crops both economically and nutritionally. Their importance is increasing day by day due to high nutritive value. Therefore, pulses and their products become important constituents in the human diet. Also they provide substantial quantities of minerals and vitamins to the diet. In addition pulses supply significant amount of energy through carbohydrates, fibers, lipids, minerals and vitamins including reasonable levels of thiamine, riboflavin and niacin. Considering the importance of pulses in processing resources, efforts have been directed to improve grain yield, nutritional quality, digestibility, storage and processing technology of grains.

Pulses, including beans and chickpea are one of the most important crops in the world because of their nutritional quality. They are rich sources of complex carbohydrates, protein, vitamins and minerals (Costa *et al.*, 2006; Wang *et al.*, 2010) [4]. Pulses have shown numerous health benefits, e.g. lower glycemic index for people with diabetes (Goni and Valentine-Gamazo, 2003) [5], increased satiation and cancer prevention as well as protection against cardiovascular diseases due to their dietary fiber content (Chillo *et al.*, 2008) [3].

Mature chickpeas (cooked) are used to prepare salads, stews, various fried/steamed/fermented snacks (*Dhokala*). Chickpea grains ground into flour (gram flour/chickpea flour/Besan) and used commonly in Indian cuisines such as *Missie Roti*, *Mirchi Bhajji*, *Pakodas*, *Bonda*, *Boondi*, *Kadhi*, *Falafel*, *Farinata*/ *Panelle* (Sharma *et al.*, 2006) [13]. Chickpeas are used to make curries and are one of the most popular vegetarian foods in the Indian Subcontinent and in diaspora communities of many other countries (Bhatt and Bhattacharya, 2001; Ramasamy *et al.*, 2004; Semwal *et al.*, 2005) [2].

Ash gourd (*Benincasa hispida*) is also one of the locally available vegetable, belongs to the family *cucurbitaceae*. Originating from China. It is widely grown in Uttar Pradesh, Madhya Pradesh, Maharashtra, Kerala, Karnataka, Andhra Pradesh and Tamil Nadu. It is called by different names in different languages viz., *Khumbaphala*, *Boodugumbala*, *Boododa gummadikaya*, *Neerpoosanikai* and *kumbalanga*. Ash gourd is rich in calcium (930 mg), iron (0.8 mg) and has less protein (0.4g) and fat (0.4g) compared to the other gourds (Gopalan *et al.*, 2007) [6].

Study showed that significant reduction in serum cholesterol, triglycerides and blood glucose levels in diabetic subjects was found when given ash gourd juice for a period of 21 days. Ash gourd also found to reduce serum LDL and VLDL (Satyanarayana *et al.*, 2010) [12]. Ash gourd finds application in various Indian heritage foods like *petha*, *sandige*, *sambar*, etc. Considering its health benefits it seems highly feasible to utilize ash gourd in development of Heritage Food.

## 2. Materials and Method

### 2.1 Ingredients

The ingredients like Chickpea or Bengal gram (*Cicer arietinum L.*), Green gram (*vigna radiata*), Black gram (*vigna mungo*), Ash guard (*Benincasa hispida*) and other minor ingredients like salt, chilli powder, turmeric, ajwan, cumin seed, garlic, coriander leaves, sesame seed etc. were purchased from local market of Parbhani. Grind the pulses and ash gourd were peeled grated using food processor. Coriander leaves were separated from stem, dried on muslin cloth till surface moisture was evaporated and finely chopped.

### 2.2 Equipments and instruments

The different equipments required for the value addition of product like mixer or grinder, Hand Molder were made available from the Department of Food Trade and Business Management and other Departments of College of Food Technology, V.N.M.K.V., Parbhani.

### 2.3 Proximate composition analysis

The proximate composition (moisture, fat, protein, ash, fiber) of raw materials (Bengal gram, green gram, black gram and ash gourd) and final product samples were determined using standard procedures (AOAC, 1995). Carbohydrate content was determined by difference method.

### 2.4 Standardization of recipe and process parameter

*Sandga* recipe was formulated using various levels of ash gourd (10%,20%,30%,40%), pulses(Bengal gram, green gram, black gram) with the spices, coriander leaves. The best product was obtained for a combination of pulses (70%), ash gourd (30%) with spices. For incorporation of ash gourd in the recipe, *sandga* formulation was made by using ash gourd at (10%) or (20%) levels each, while the levels for pulses were maintained at (80%) or (90%) respectively. The recipe made with pulses at (100%) level was taken as control. The five samples were prepared with the given composition and dried at 70° C till constant weight are obtained.

### 2.5 Composite flour formulation for preparation of Indian heritage food *Sandga*.

In order to formulate the recipe of composite flour for preparation of *Sandga* with enhanced nutritional quality, different preliminary trials were carried out followed by information sensorial evaluation of product to optimize the maximum suitable concentration of pulp of ash guard incorporation. It was observed that if the concentration of

Chickpea flour, Green gram flour, and Black gram flour incorporation is in same quantity then the overall quality of prepared product is being drastically reduced as product is becoming hard. Hence, on the basis on preliminary trials, following recipes were finalized for experimentation.

**Table 1:** Standardization of Formulation for Composite Flour

Sr. No.	Flour	Composition of Composite flour
1	Bengal gram flour	70
2	Green gram flour	20
3	Black gram flour	10

**Table 2:** Different formulations of Ash gourd used in *Sandga* preparation

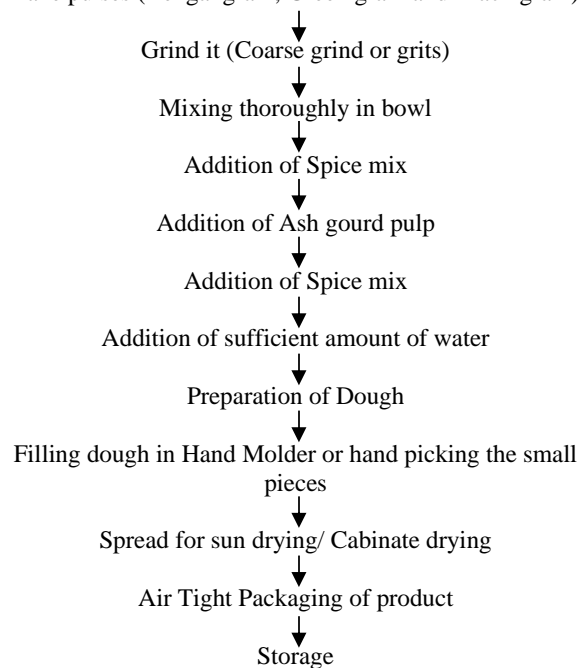
Sample	Ash gourd (g)
T <sub>0</sub>	-
T <sub>1</sub>	10
T <sub>2</sub>	20
T <sub>3</sub>	30
T <sub>4</sub>	40

**Table 3:** Standard recipe for the preparation of Indian heritage product *Sandga*

Sr. no.	Ingredients	Weight (g)
1	Bengal gram coarse flour	70
2	Green gram coarse flour	20
3	Black gram coarse flour	10
4	Ash Guard	30
5	Salt	4
6	Chilli powder	2.5
7	Turmeric powder	1
8	Cumin seed	1.5
9	Ajwain	0.5
10	Sesame seed	5
11	Coriander leaves	6
12	Garlic/ ginger paste	5
13	Water	10 (ml)

## 3. Method for preparation of Indian heritage food *Sandga*. Preparation of Indian heritage Food (*Sandga*)

Take pulses (Bengal gram, Green gram and Black gram)



**Flow sheet 1.** Process for preparation of Indian heritage product.

### 3.1 Overall acceptability of Products

Organoleptic evaluation is the way of knowing acceptability of product using the senses like appearance, color, flavor, taste and overall acceptability. It is also a way of stimulating the consumer response by a few experienced judges. Based on preliminary screening by consideration of motivation and willingness of judges to test sample, a panel of ten judges comprising of faculty and students of the institute was formed. Sensory evaluation was carried out by standard method using 9 point hedonic scale. All indexes were measured using a scale from 0 to 9, where a score of 9 represents excellent quality and a score of 0 represents the lowest quality level (Meilgaard and Civille, 1999) [8].

### 3.2 Statistical analysis

The analysis of variance was followed for interpreting the differences between the different variations for individual sensory characters (Panse and Sukhatme, 1985) [10].

### 3.3 Sensory Evaluation of Sandga

Sensory Acceptance tests were performed for 'Sandga' which were formulated by the addition of ash gourd in different proportions to know the acceptability of prepared product. The acceptance scores were assigning for various sensory parameters- appearance, color, flavor, taste, texture and overall acceptability.

**Table 4:** Sensory evaluation of *Sandga* incorporation with ash gourd

Samples	Appearance	Color	Flavor	Taste	Texture	Overall Acceptability
T <sub>0</sub>	7.5	7.6	7.4	7.4	7.3	7.44
T <sub>1</sub>	7.6	7.8	7.7	7.5	7.6	7.64
T <sub>2</sub>	8.0	8.1	7.8	7.9	7.8	7.92
T <sub>3</sub>	8.1	8.4	8.2	8.4	8.3	8.28
T <sub>4</sub>	8.2	8.1	8.3	8.2	8.1	8.12
SE (±)	0.1506	0.1155	0.0816	0.1174	0.1414	0.0117
CD at 5 %	0.4532	0.3476	0.2458	0.3533	0.4257	0.0353

T<sub>1</sub> - Pulses flour (90%), Ash gourd (10%) T<sub>2</sub> - Pulses flour (80%), Ash gourd (20%) T<sub>3</sub> - Pulses flour (70%), Ash gourd (30%); T<sub>4</sub> - Pulses flour (60%), Ash gourd(40%).

It can be observed from Table-4 that T<sub>3</sub> sample has been selected by panel members all the different quality parameter which is *Sandga* sample in which 30% ash gourd was blended with pulses scored the highest 8.28 overall acceptability, whereas T<sub>1</sub> received the lowest (7.44). The acceptance of samples depends on the ingredient variation. The sample T<sub>4</sub> was also reported as statistically as per with T<sub>2</sub> and T<sub>3</sub> samples and significantly superior than the T<sub>1</sub> sample. The next parameter i.e., color serves as important parameter for the acceptance of food samples. The highest score for colour of sample T<sub>3</sub> was obtained as (8.4). The lowest score found in the sample T<sub>0</sub> score (7.6) because there is no ash gourd used. The score in respect of texture ranged between 7.3 to 8.3 T<sub>1</sub> and T<sub>3</sub> treatment combinations.

### 4. Conclusion

Thus the present investigation can be conclude that the final product *Sandga* can be prepared by using ash gourd with different four combinations. Ash gourd used in product resulted an increase in the nutritional value and sensory quality of the product. Adding of 30% ash gourd in the product *sandga* gave the best overall sensory acceptability. Further the prepared product can be stored at room temperature up to the whole year.

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