

Formulation And Quality Evaluation Of Value Added Horse Gram Food Products And Their Nutritional Perception

R.Shobana Ishwarya, A.Swarnalatha

ABSTRACT: Horse gram (*Macrohijloma uniflomm*) is considered to be the poor man's pulse particularly in South India. it is also known as Gahat, Muthira, Kulath or Kulthi, Hurali. The present study conducted to evaluate the nutritional and sensory evaluation of developed horse gram products. two different products were developed using different kind of horse gram flour. The horse gram flour was prepared in two different types as germinated horse gram flour and roasted horse gram four. The germinated horse gram flour replaced with wheat flour in different proportion to develop cookies and roasted horse gram flour replaced with ragi flour to develop Adai. The sensory evaluation of developed horse gram value added products were analysed. In sensory evaluation, Variation I (20% G.H.F) in cookies and Variation II (60% R.H.F) in adai were found to be superior than other samples. The nutritive value of the developed products was evaluated shown higher nutrient content such as iron and calcium than the standard product. The shelf life of the developed horse gram cookies were studied using three types of packaging. This study encourages to find different value added products using horse gram flour may help to consume by more people with full inspiration of this legume. To enforce the people to gain the nutritious knowledge about horse gram cookies. Consumption of horse gram powder daily will aid in weight loss in adults.

Keywords : germinated ,sensory evaluation, iron and calcium horse gram cookies

INTRODUCTION

Legumes are good sources of cheap and widely available proteins for human consumption. They are staple foods for many people in different parts of the world. Legume seeds have an average of twice as much protein as cereals and the nutritive value of the proteins are usually high. Legumes seeds are of prime importance in human and animal nutrition due to their high protein content (20- 50%) and have historically been utilized mainly as the whole seeds. Horse gram contains 18-29 per cent of protein, hence it can be considered on par with other pulses (Sundarraaj and Thulsidas, 1986). In addition to protein, horse gram is also a good source of minerals of 3.2 g per cent, calcium (287 mg/100 g), iron (8.4 mg/100 g) and other nutrients like crude fibre (5.3 g per cent), carbohydrate (57.2 g per cent), energy (321 Kcal/100 g). Horse gram is also a good source of vitamins like thiamine - 0.42 mg, riboflavin - 0.2 mg niacin- 1.5 mg and vitamin - C 1.0 mg/ 100 g (Gopalan et al., 2007). The crude fibre, calcium and iron content of horse gram are higher than the red gram which is largely consumed by majority of the Indian population. Horse gram has been reported to have a lot of medicinal value. The rich fiber content of horse gram helps in reducing the body fat in fast mode. It is believed that eating horse gram makes our body strong and is also good in treating stones, menstrual problems, obesity, curing cough and cold. Sprouting is the natural germination process by which seeds or spores put out shoots, plants produce new leaves or buds, or other newly developing parts experience further growth. In the field of nutrition, the term signifies the practice of germinating seeds, to be eaten raw or cooked. It also breaks down phytate, a form of phytic acid that normally decreases absorption of vitamins and minerals in the body. The present study designed to evaluate the nutritional and sensory characteristics of developed horse gram value added products.

MATERIALS AND METHODS

Horse gram was procured from departmental store in salem. It was thoroughly cleaned to remove dirt and extraneous matters. The horse gram seeds were cleaned and free from broken seeds, dust and other foreign materials and then soaked in tap water for 12 hr. The soaked seeds are tied in a clean cotton cloth for 24 hr to get germinated. The germinated seeds are dried under the sunlight for 2 days in optimum temperature. The dried seeds are milled into flour. RoastingThe horse gram seeds are roasted in a low flame for 15 minutes until the colour changed to light brown colour. The roasted horse gram seeds are ground into flour.

Figure -1 Processing of horse gram flour

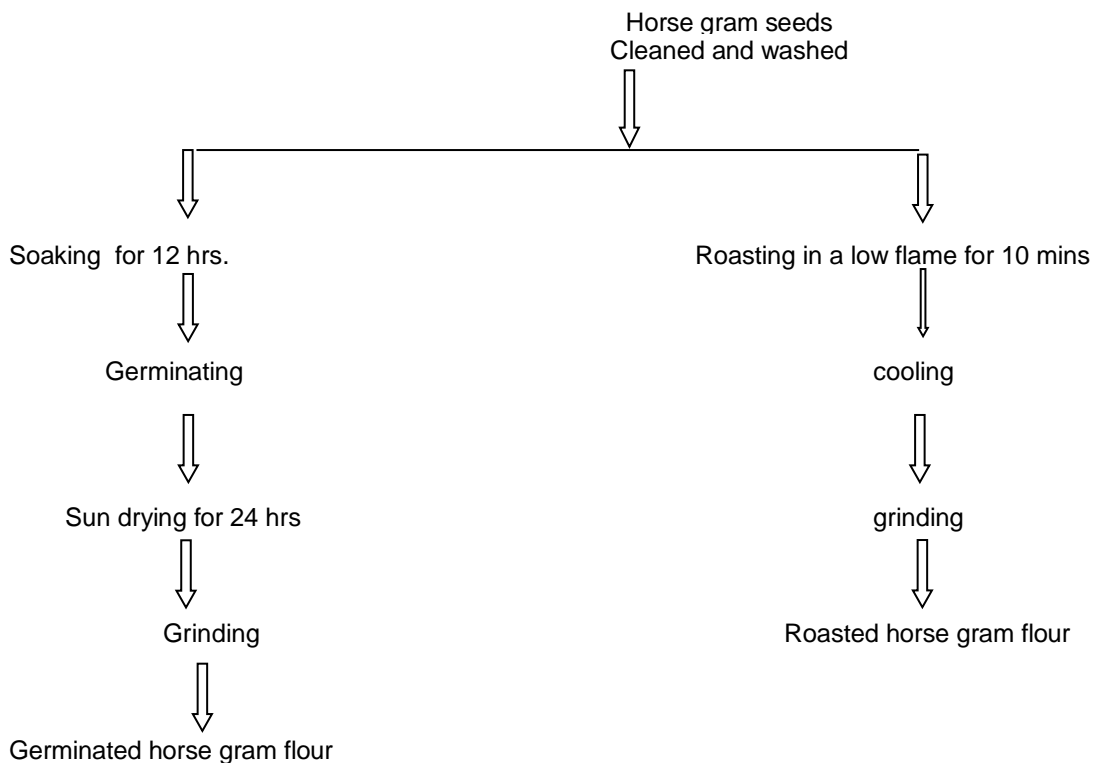
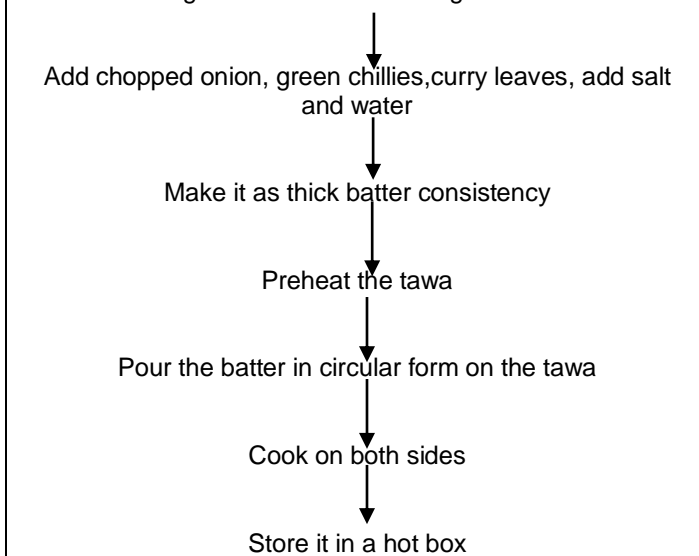


Table 1: FORMULATION OF GERMINATED HORSE GRAM FLOUR INCORPORATED COOKIES

PARTICULARS	STANDARD	VARIATION - I	VARIATION - II
Refined wheat flour	100gm	80gm	70gm
Icing sugar	50gm	50gm	50gm
Horse gram	-	20gm	30gm
Fat	50gm	50gm	50gm
Milk powder	5gm	5gm	5gm
Vanilla powder	2gm	2gm	2gm

The Horse gram value added cookies were prepared in two different proportions which are named as variation I and variation II respectively. Preparation of horse gram value added adai: Roasted horse gram flour and ragi flour were sieved twice. Mix the flours, water, chopped onion, salt, and curry leaves together and make it as a thick batter. Heat the pan. add few drops of oil and smear it all over the pan. Pour one ladle of batter and spread it to thick. when it gets cooked on one side flip it and cook on the other side as well until crisp.

Figure -2 PREPARATION OF HORSEGRAM ADAI
Ragi flour + roasted horse gram flour



SENSORY EVALUATION

The sensory evaluation of developed products were analyzed by 20 untrained panelist using 9 point hedonic rating scale. The sensory characteristics such as color and appearance, flavor, texture, mouthfeel, crunchiness and overall acceptability were analyzed.

SHELF LIFE OF COOKIES

The shelf life of the developed cookies were analysed using three different types of packaging material. The aluminum

foil cover, vacuum packaging and the ventilated packaging were used in this study.

RESULT AND DISCUSSION

The nutrient content and nutritional properties of germinated and roasted horse gram of the developed products were studied. The results are shown in table -3

Table -3 Nutrient composition of horse gram value added cookies – variation I

S.No	Parameters	Triplicate Value			Mean ± S.D
		A	B	C	
1	Carbohydrate (gm)	62.73	61.85	61.48	62.02 ± 0.64
2	Protein (gm)	12.48	12.49	12.52	12.50 ± 0.02
3	Fat (gm)	22.24	22.37	22.34	22.32 ± 0.07
4	Fiber (mg)	8.48	8.91	8.2	8.53 ± 0.36
5	Soluble Fiber (mg)	7.21	7.63	6.91	7.25 ± 0.36
6	Insoluble Fiber (mg)	1.27	1.28	1.29	1.28 ± 0.01
7	Calcium (mg)	2.14	2.32	2.85	2.44 ± 0.37
8.	Iron (mg)	4.57	4.61	4.83	4.67± 0.23

The table 3 depicts the major nutrients were analyzed and the triplicate value were found. The mean & standard deviation were also calculated. The macro nutrients carbohydrate, protein, fat were analyzed and minerals such as calcium, iron and fiber content were also estimated

Table 4 Nutrient composition of developed horse gram Adai (sample 2)

S. No	Parameters	Triplicate Value			Mean ± S.D
		A	B	C	
1	Carbohydrate (gm)	59.35	61.29	59.84	60.16 ± 1.01
2	Protein (gm)	11.45	10.46	10.47	10.79 ± 0.57
3	Fat (gm)	19.42	19.48	19.62	19.51 ± 0.10
4	Fiber (mg)	4.51	4.35	4.27	4.38 ± 0.12
5	Soluble Fiber (mg)	4.24	4.06	3.92	4.07 ± 0.16
6	Insoluble Fiber (mg)	0.27	0.29	0.35	0.30 ± 0.04
7	Calcium (mg)	1.42	1.38	1.63	1.47 ± 0.14
8.	Iron (mg)	5.48	5.71	5.53	5.57 ± 0.14

This table shows that the nutrient content present in the horse gram adai. The horse gram adai gives 59.84 gm of carbohydrate, 10.47 gm of protein, 19.62 gm of fat, 4.27 gm of fiber in which 3.92gm of soluble fiber and 0.35gm of insoluble fiber and 163mg of calcium and 5.57mg of iron were present.

Table 5 Sensory evaluation of horse gram value added products

CHARACTERISTICS	HORSE GRAM VALUE ADDED COOKIES		HORSE GRAM VALUE ADDED ADAI	
	VARIATION I	VARIATION II	VARIATION I	VARIATION II
Color & appearance	7.85	7.75	8.3	8.25
Texture	8	7.65	7.85	7.95
Flavor	7.85	7.7	7.4	7.55
Crunchiness	8.05	7.8	7.2	7.4
Mouth feel	7.95	8.3	6.45	7.9
Taste	8.0	7.8	6.7	8.05
Overall acceptability	8.15	8.1	6.6	8

This table reveals that the sensory score obtained by the developed products horse gram cookies and horse gram adai. Among the two variations of horse gram value added products, Variation I in horse gram cookies scored superior than variation II. In Horse gram value added adai, Variation II scored higher than the other variation in all attributes.

SHELF LIFE OF THE DEVELOPED COOKIES

The developed cookies were used to analyze the shelf life in three different packaging for 3 months. The packages used in this study are ventilated packaging, vacuum packaging, aluminium foil packaging. The developed cookies were packed in these packages under optimum temperature for 3 months. The study shown that the aluminium foil and vacuum packaging was best among the three packaging. It retains the cookies taste, flavor and crispiness.

CONCLUSION

The present study concluded that, the cookie developed with 20% germinated horse gram flour and the adai made with 60% roasted horse gram flour were highly accepted by the panelist through sensory evaluation. It contains good quality of nutrients such as carbohydrate, fat, protein, fiber and calcium and iron. Though it contains more number of nutrients horse gram is considered as underutilized legume. The germinated horse gram flour value added cookies were packed with energy and major nutrients. It will be a good snack for the school going children to get instant energy. The roasted horse gram value added adai helps in weight loss in conditions as it contains slow digestible starch which make ideal for diabetic and obese patients. Its low lipid and sodium content makes it easily digestible. Being a locally available dhal horse gram can include in the regular diet to enhance the nutritional benefits and to improve the the nutrient availability

FUTURE RECOMMENDATIONS

- This study encourages to develop different value added products using horse gram flour, it helps to consume people with full inspiration of this legume.
- To enforce the people to gain the nutritious knowledge about horse gram cookies.
- Consumption of horse gram powder daily will aid in weight loss in adults.
- Horse gram contains a high amount of dietary fibre which helps to clear out the gut and to eliminate constipation. Regular consumption is also helpful in

reducing acidity, stomach infections and intestinal worms.

- The horse gram seeds have greater beneficial effects on health of hyperglycemic individuals.

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