

Development And Quality Evaluation Of Germinated Bengal Gram (*Cicer Arietinum*) Pickle

Luxita Sharma, Deepika Dhawan, Sushmita Kumari

Abstract: Bengal gram on germination has high nutritive value in terms of protein, fibre and carbohydrates yet it has low shelf life of about two to three days at room temperature, hence to enhance its shelf life, a protein rich value added food product can be developed in the form of pickle with spices, oil and salt as preservatives. After sensory evaluation of developed food product: germinated Bengal gram pickle, sensory scores were found to be 7.1 ± 0.43 , 7.65 ± 0.726 , 7.05 ± 0.920 , 7.8 ± 0.793 , 7.5 ± 0.92 , and 7.7 ± 0.98 for taste, colour, texture, consistency, appearance and overall acceptability respectively. In this study, nutritional evaluation of the food product was also done. Germinated Bengal gram pickle was found to be nutritious having good source of protein and fibre. Nutritional analysis revealed the following values: energy 383.00 Kcal, fat 23.48g, protein 11.36g, carbohydrates 31.66g, sugar 1.92g, dietary fibre 13.60g, moisture 24.33g, and ash 6.27g per 100g of pickle. This food product will help to promote the concept of household adaptable food development from locally available foods and provide valuable source of nutrients.

Index Terms— fibre, germination, nutritional analysis, pickle, preservatives, protein, sensory evaluation,

1 INTRODUCTION

BENGAL GRAM (*Cicer arietinum*), also known as "beans" or "chana", is a member of bean family [1]. It is one of the most used legumes all over the world, India being the leading consumer [2]. On germination of Bengal gram, may provide efficient amount of nutrients specially protein and fibre. Sprouting of legumes improves digestibility and better availability of essential amino acids, iron and calcium than in dormant seeds. Apart from enhanced nutritional value, germination improves taste and texture. This quality can be used creatively in producing value added food products along with goodness of nutrients [3]. However, germinated Bengal gram sprouts are susceptible to spoilage due to low shelf life, hence must be preserved. Pickling is the process of preserving food by anaerobic fermentation in salt and water solution (brine solution) or by soaking in vinegar, while vegetable oil and other natural preservatives like spices may also be used. Salt has an osmotic effect as it causes high osmotic pressure; dehydrating the food, while spices and condiments have bacteriostatic effect against microorganisms. Vegetable oil also prevents spoilage and is an important preservative [4, 5]. In this study, cooking methods of germination and pickling is used to develop germinated Bengal gram pickle followed by its sensory appraisal and nutritional analysis.

2 MATERIALS AND METHODS

This study involved the food product development, standardisation, sensory evaluation and nutritional analysis of germinated Bengal gram pickle. The materials required were whole Bengal gram to germinate it. After successful germination, in a jar salt, mustard oil,

black pepper, cinnamon powder, oregano, fennel seeds and lemon along with germinated Bengal gram was added to give flavour and increase its shelf life. The germinated pickle was sundried for 3 days, thereafter sensory analysis and laboratory testing of the developed food product was done. The work was accomplished in the department of Dietetics and Applied Nutrition, Amity University, Haryana.

2.1 Development of germinated Bengal gram pickle

Bengal gram was firstly, washed with water to remove dirt and dust and then soaked in cold water overnight. Soaking makes the pulse tender and hastens the process. By rehydration moisture content is increased from 10 per cent to 60-70 per cent. Soaking involves placing food in water and leaving in it, so that the food absorbs the water and becomes soft and easier to eat and cook. After being soaked overnight, water was drained off and tied in a loosely woven cotton cloth and hanged. It took 2-3 days to germinate properly [4]. In a jar, salt, mustard oil, black pepper, cinnamon powder, oregano, fennel seeds and lemon along with germinated Bengal gram was added and kept for 3 days for sun drying.

2.2 Nutritional analysis of germinated Bengal gram pickle

For Nutritional analysis protocol involved determination of energy, fat, protein, carbohydrates, sugar, dietary fiber, moisture and ash, using standard procedures, techniques, equipments and chemicals [6,7].

2.3 Sensory evaluation of germinated Bengal gram pickle

Sensory analysis was done using 9 point hedonic scale for evaluating sensory attributes including colour, taste, consistency, appearance, texture and overall acceptability by a panel of selected trained members using triangle test. For this, standard methods were followed [8].

3 RESULTS AND DISCUSSIONS

3.1 Nutritional analysis

Nutritional analysis showed that sprouted Bengal gram pickle has 24.33g moisture, 6.27g ash, 31.66g carbohydrate, 11.26g protein,

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23.48g fat, 383.00Kcal energy, 13.60g dietary fiber and 1.92g sugar in 100g of developed food product. The present investigation revealed that sprouted Bengal gram pickle is good source of carbohydrate, protein, dietary fiber and fat. This information has been tabulated in table 3.1 and figure 3.1.

3.2 Sensory analysis

Sensory evaluation of sprouted Bengal gram pickle showed the overall acceptability was found quite satisfactory when compared with a standard mix vegetable pickle. Thus, sprouted Bengal gram pickle could be potentially utilized in various meals to enhance the nutrient intake. The detailed analysis has been tabulated in table 3.2 and figure 3.2.

Table 3.1.: Data representing the nutrient analysis of sprouted Bengal gram pickle

Nutrients	Sprouted Bengal gram pickle
Moisture (g/100g)	24.33
Ash (g/100g)	6.27
Carbohydrate (g/100g)	31.66
Fat (g/100g)	23.48
Protein (g/100g)	11.26
Energy (Kcal/100g)	383.00
Dietary fibre (g/100g)	13.60
Sugar (g/100g)	1.92

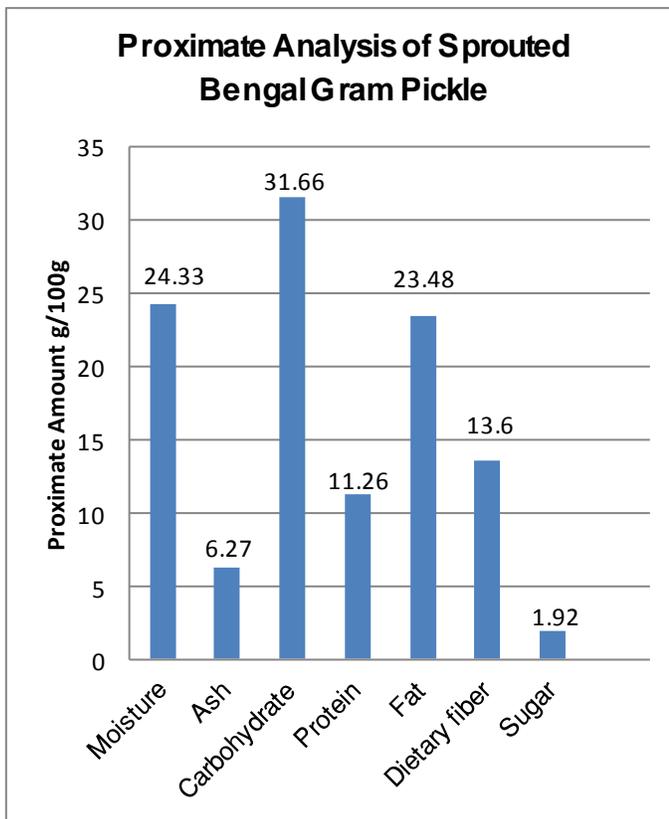


Figure 3.1: Nutrient analysis of sprouted Bengal gram pickle

Table 3.2: Mean and standard deviation scores of sensory evaluation of sprouted Bengal gram pickle

Attributes	Standard (Std.)	Sprout Bengal gram pickle (A)
Taste	7.1±0.43	7.65±0.82
Colour	7.65±0.72	7.85±0.87
Texture	7.05±0.92	7.85±0.93
Consistency	7.8±0.79	7.75±0.91
Appearance	7.5±0.92	7.95±1.09
Overall acceptability	7.7±0.98	7.8±0.83

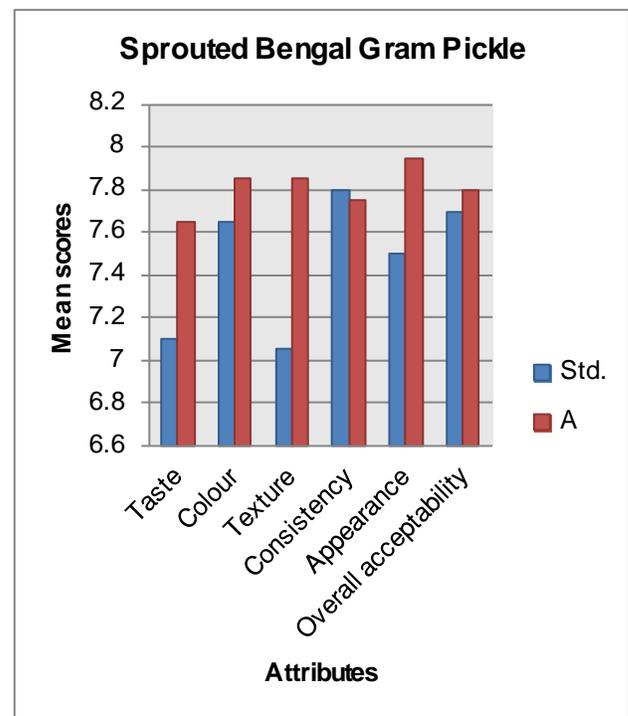


Figure 3.2: Sensory scores for sprouted Bengal gram pickle

4 CONCLUSION

A study was conducted to develop sprouted Bengal gram pickle and analyze its nutritional and sensory appraisal. Bengal gram may be utilized in varieties of dishes in Indian cuisine. Its nutritional value was studied including ash, sugars, energy protein, carbohydrate, fat, dietary fibre content. Bengal gram may provide valuable sources of protein, fiber, folic acid and some of the minerals such as iron and phosphorus. Spices and condiments used in this product are to give a certain flavor and provide antioxidant properties. Pickle production is the technique for preservation of food. There are many methods of preserving food but pickling and sun drying are one of the best and oldest method used. Here, it can be concluded that sprouted Bengal gram pickle has been found to be consumer acceptable on the basis of taste, color, texture, consistency, appearance and overall acceptability. It contains rich amount of protein and fibre as seen in the analysis. Thus, sprouted Bengal gram pickle could be potentially

utilized in various meals to enhance the nutrient intake. The nutritional benefits associated with protein and transaminase increase during germination is significant, therefore consumption of shoot impulses must be promoted. *Cicer arietinum* offers maximum nutritional benefits compared to other pulses because of its high protein content and high transaminase activity [9]. It can be concluded that dehydrated Bengal gram usage in the form of rehydrated food produces traditional food products, significantly improve their organoleptic quality and contribute to their high quality. This recipe is cheap and nutritious and may be effective in solving some nutritional problems, especially lack of protein in vulnerable groups such as children and adolescents in India and other developing countries. This food product will be able to promote the concept of household adaptable food product development from locally available foods and provide a potential source of healthy nutrients.

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