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Original Research Paper

Home Science

NUTRITIONAL PROFILE AND SENSORY ATTRIBUTES OF SESAME SEEDS FLOUR INCORPORATED BISCUITS

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ABSTRACT Sesame belongs to the family Pedaliaceae and scientifically named as Sesamum indicum L. Sesame seeds are rich in protein, fiber and zinc. The purpose of the study was to incorporate sesame seeds which are commonly discarded as waste to produce functional food. Sesame seeds flour was prepared and incorporated in biscuits. Four variants seeds incorporated (5%, 10%, 20% and 30%) biscuits were prepared. Sensory evaluation was done by a panel of 20 judges. Biscuits with 30% were highly accepted and the nutritional composition of sesame seeds had a moisture content of 3.02g/100g. Other components such as protein, crude fiber, fat and carbohydrate were 40.5g/100 correspondingly. Ash content was 4.41g/100g which was further analyzed into various major minerals giving analyzed mean as zinc 1.85mg/100g, iron 16.25mg/100g and calcium 28.18mg/100g.

KEYWORDS : Sesame, Sensory, Nutrients, Zinc, Protein, Biscuits.

INTRODUCTION

Sesame (*Sesamum indicum L.*) belonging to the family *Pedaliaceae*, is native to Asian and some African countries. It is believed to be one of the oldest crops globally, cultivated for over 4,300 years in Babylon and Assyria. Sesame is primarily cultivated nationally and internationally for its seeds, which have 50% oil content. Additionally, it finds applications in pharmaceutical and chemical industries (Hwang, 2005). Sesamum indicum L. is gaining priority as an oilseed and is also used as a condiment and in therapeutics. The potential use of sesame seed oil in health and food has been documented for centuries. Sesame oil has been known since Vedic times and is highly esteemed in Ayurveda. In Ayurvedic medicine, it holds significant importance, with practitioners believing that sesame oil possesses antibacterial and antifungal properties. It is also believed to reduce stress, lower cholesterol, and detoxify the body (Elleuch et al., 2007; Namiki, 2007). The rich magnesium content of sesame seeds can be helpful for those suffering from respiratory problems, while the zinc and calcium present in sesame seeds are powerful tools in combating osteoporosis. Sesame seeds contain sesamol, an essential antioxidant and anti-inflammatory compound, known to be beneficial in battling heart disease and atherosclerosis (Hajimahmoodi et al., 2008). Sesame contains significantly more polyunsaturated fats, including omega-3 fatty acids, which protect the heart from damage, regulate blood pressure, and might reduce the risk of type-2 diabetes. In the Orient, sesame has long been regarded as a health food for increasing energy and preventing aging. Sesame seeds are an excellent source of nutrients and are commonly used in fortification to add nutritional value to various food products (Amandeep et al., 2019).

Sesame seeds are a rich source of essential minerals such as calcium, iron, magnesium, and zinc (Abbas et al., 2022). The fortification of sesame seeds in functional foods can help address deficiencies in these minerals, particularly in populations with limited access to nutrient-dense foods (Desire et al., 2021). Sesame seeds are also a good source of dietary fiber, which helps maintain digestive health and prevent chronic diseases such as heart disease and diabetes (Disseka et al., 2018). Incorporating sesame seeds into fortified foods can increase the fiber content and promote overall health. Sesame seeds are high in antioxidants such as sesamol, sesamin, and sesamolin, which can protect against oxidative stress and prevent chronic diseases (Ghosh et al., 2021). The fortification of sesame seeds in functional foods can increase the antioxidant potential of food products and provide additional health benefits (Hashempour-Baltork et al., 2018). Sesame seeds are easy to incorporate into a wide range of food products, including bread, bars, cookies, pasta, cereals, and snacks. They can be utilized to enhance the nutritional efficiency and antioxidant potential of any functional food, including whole seeds, flour, and oil, making them a versatile and convenient option for fortification to eradicate malnutrition (Malecki et al., 2020). Therefore, the focus of the current study was on the widespread use of functional food with sesame seed flour/powder in different concentrations. The present study aimed to develop sesame biscuits. For this purpose, sesame flour was analyzed for proximate and selected minerals. Subsequently, biscuit samples were analyzed for compositional (proximate and minerals), color, texture, and sensory evaluation.

MATERIAL AND METHODS

Preparation Of Sesame Seed Flour

The functional ingredient sesame seeds and other ingredients were purchased from a general store of Jaipur, Rajasthan. The seeds were cleaned and freed from foreign materials and the seeds hulls were removed manually.

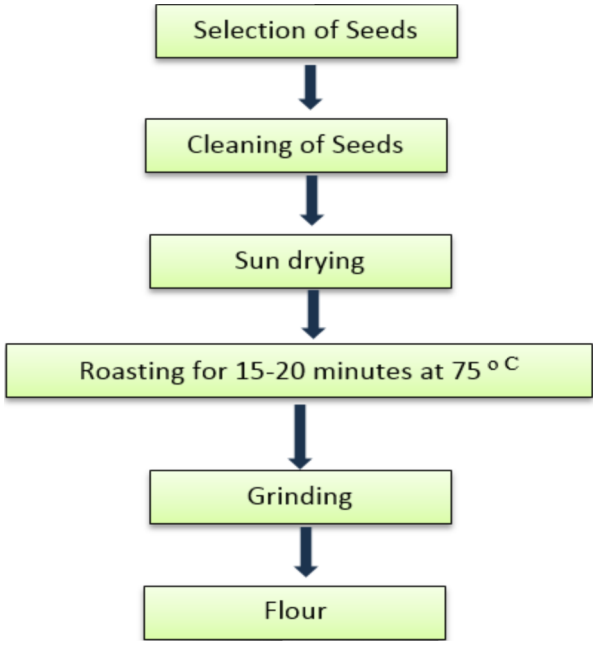

Figure: Flowchart representing preparation od sesame seed flour

The biscuits were prepared by incorporating sesame seeds powder in different proportion as a main ingredient. The four variations of product were prepared. In the development process biscuits were prepared with sesame seeds powder used in four proportions variants A- 5%, B-10%, C-20% and D-30% and one Std-control sample of biscuits were prepared. The developed biscuits were gone through sensory analysis by a semi trained panel of 20 university going females (25-28yrs) from Department of Home Science (Food Science and Nutrition), Banasthali Vidyapith, Rajasthan. The judges were served biscuits with one control and four variant samples in food lab. Judges were assigned to measure the degree of acceptance of product based on color, flavor, appearance, texture, taste and overall acceptability using a score card of 9-point Hedonic Rating Scale from "like extremely and dislike extremely".

30% of sesame seeds biscuits were the most acceptable variant of biscuits and nutritional analysis of most accepted product will be done. Estimation of proximate composition i.e. moisture, protein, fat, fiber, ash, carbohydrate and estimation of minerals i.e. zinc, iron and calcium was done by using standardized method of AOAC.

Statistical Analysis

The data was analyzed with the help of various statistical tools such as mean and standard deviation. To test the significant difference between the control and the experimental samples was applied using SPSS16 software.

RESULT AND DISCUSSION

Biscuits are popular foodstuff consumed by a wide range of population due to their varied taste, long shelf life, and ready to eat nature, easy transportation, and availability in numerous taste relatively low cost and textural profiles. Consumption of market and increased demand for healthy, natural and functional products attempts are being made to improve the nutritive value of biscuits and functionality by modifying their nutritive composition. Biscuits incorporated with pumpkin seed flour found to be highly acceptable at 30% level through sensory evaluation. Overall acceptability mean score for standard, variants-A, B, C and D biscuits were 8.25, 8.32, 8.55, 8.72 and 8.82 respectively.

Sensory analysis of biscuits is presented in Table 1. 30% biscuits incorporated with sesame seeds flour gained maximum acceptability scores as compared to the 5%, 10% and 20% biscuits and control sample obtained lower acceptability score than the test samples due to improved appearance, color, texture, flavor, taste and overall acceptability.

Table1. Sensory Acceptability Scores Of Biscuits Incorporated With Sesame Seed Flour

Code of Recipe	Color	Appearance	Flavor	Texture (Mouth feel)	Taste	Overall Acceptability
Std	8.57± 0.49	8.50± 0.48	8.42± 0.49	8.63± 0.74	8.51± 0.49	8.56± 0.58
A	8.46± 0.49	8.47± 0.49	8.36± 0.48	8.52± 0.49	8.47± 0.67	8.42± 0.49
B	8.52± 0.58	8.60± 0.58	8.50± 0.59	8.55± 0.49	8.50± 0.50	8.57± 0.73
C	8.68± 0.42	8.66± 0.54	8.74± 0.42	8.75± 0.43	8.76± 0.39	8.64± 0.56
D	8.75± 0.43	8.85± 0.35	8.80± 0.40	8.82± 0.36	8.91± 0.23	8.80± 0.40

Proximate composition of developed biscuits

Data on proximate composition of biscuits is given in Table 2. It was found that the moisture content of sesame seeds biscuit was 3.02±0.25g/100g and control was 4.02±0.05. Mineral ash content was found in sesame seeds biscuit was 4.41±0.05g/100g and control were 0.80±0.02. The crude fiber, fat, protein and carbohydrate content estimated in the sesame seeds biscuit were 13.35±0.30, 26.03±0.49, 11.72±0.40 and 40.5±0.11g/100g and control were 1.70±0.04, 25.50±0.45, 6.60±0.25, 6.60±0.25 and 61.38±0.02g/100g respectively.

Table2. Proximate Composition Of Sesame Seeds Incorporated Biscuits

Nutrients	Control	Biscuit
Moisture (g/100g)	4.02±0.05	3.02±0.25
Mineral Ash (g/100g)	0.80±0.02	4.41±0.05
Crude Fiber (g/100g)	1.70±0.04	13.35±0.30
Fat (g/100g)	25.50±0.45	26.03±0.49
Protein (g/100g)	6.60±0.25	11.72±0.40
Carbohydrate (g/100g)	61.38±0.02	40.5±0.11

Mineral Content Of Sesame Seeds Flour Incorporated Biscuits

Mineral content of biscuits is given in Table 3. It is found that the zinc content of incorporated sesame seeds biscuit was 1.85±0.30mg/100g and control was 0.20±0.25. Calcium and iron content estimated in the biscuit were 28.18±0.28 and 16.25±0.01 and control was 13.01±0.02 and 6.25±0.20 respectively.

Table3. Mineral Content Of Sesame Seed Flour Incorporated Biscuits

Minerals	Control	Biscuit
Iron (mg/100g)	6.25±0.20	16.25±0.01
Calcium (mg/100g)	13.01±0.02	28.18±0.28
Zinc (mg/100g);	0.20±0.25	1.85±0.30

CONCLUSION

From the above results, it was observed that pumpkin seed flour supplementation whether in worldwide favorite bakery product i.e. 30% incorporated pumpkin flour biscuit is highly acceptable than the control sample. Protein, fiber, ash, iron, calcium and zinc were increased in the incorporated pumpkin flour biscuit. Thus it can be concluded that the consumption of pumpkin seed flour incorporated products should be encourage in routine diet so as to improve the nutritional status of the individuals. Value added products using pumpkin seed flour can be supplemented by heart disease, atherosclerosis and diabetic patients.

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