



FORMULATION AND STANDARDIZATION OF FLAX SEED MASALA COOKIES FOR OBESITY AND CAUSES OF OBESITY IN WOMEN IN THIS MODERN WORLD

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ABSTRACT Recent awareness and interest in health and wellness has shifted focus on healthy eating and life style changes among people. Baked products are consumed by all age group people and the consumer demand is increasing towards low calorie high fiber and high protein food products. Obesity is a major cause in this modern world due to the readymade life style and eating habits. The women are more prone to the obesity due to their eating habits and less physical activities and snacking in between meals is the major cause of obesity. The flaxseed incorporated masala cookies has its beneficial and nutraceuticals properties and also make it an excellent snack for obesity. The objective of current study is the acceptability of flaxseed powder incorporated in masala cookies and to study the nutritive value of flaxseed powder and also to study the shelf life of cookies in different packing materials. The flaxseed masala cookies were prepared by incorporating flaxseed powder in wheat flour. Physical parameter was assessed. Flaxseed masala cookies were subjected to sensory analysis and also standardization of cookies were done. Sensory analysis of masala cookies revealed all its attributes. This study reveals that the formulated flaxseed incorporated masala cookies which is high in fiber and protein and has high sensory profile. The flaxseed masala cookies were popularized among women who are obese, through counselling and demonstration made them to encourage in consuming flaxseed masala cookies which is high in fiber and protein can have good benefit on obesity. The women are made aware about the nutritional benefit of flaxseed. For the process of popularization the questionnaire was prepared to check the awareness and acceptability of flaxseed masala cookies among obese women. The Popularization was done among 20 obese women and the flaxseed incorporated masala cookies showed higher acceptability of the product than the standard masala cookies. The 20 obese women accepted the flaxseed incorporated masala cookies and only 10 obese women accepted the standard masala cookies.

KEYWORDS : Flaxseed (*Linum usitatissimum*), nutraceuticals properties, obesity, standardization, masala cookies.

INTRODUCTION

The consumption of fast food and snacks has increased significantly in recent years revealing a trend of change in lifestyle of the population. Because of the growing consumer demand for healthy, natural and convenient foods attempt are being made to improve the nutritional value of snack foods. Globalisation of Indian foods and its culture are the core factors for popularization of ready to eat foods and snacks.

Flaxseed is one of the oldest crops, having been cultivated since the beginning of civilization. The Latin name of the flaxseed is *Linum usitatissimum*, which means "very useful". Flax was first introduced in United States by colonists, primarily to produce fiber for clothing. Every part of the flaxseed plant is utilized commercially, either directly or after processing. There is a small difference in using the terms flaxseed and linseed. Flaxseed is used to describe flax when consumed as food by humans while linseed is used to describe flax when it is used in the industry and feed purpose. In the last two decades, flaxseed has been the focus of increased interest in the field of diet and disease research due to the potential health benefits associated with some of its biologically active components. Flaxseeds have nutritional characteristics and are rich source of ω -3 fatty acid: α -linolenic acid (ALA), short chain polyunsaturated fatty acids (PUFA), soluble and insoluble fibers, phytoestrogen lignans (secoisolariciresinol diglycoside-SDG), proteins and an array of antioxidants. Its growing popularity is due to health imparting benefits in reducing cardiovascular diseases, decreased risk of cancer, particularly of the mammary and prostate gland, anti-inflammatory activity, laxative effect, and alleviation of menopausal symptoms and osteoporosis. This review is an attempt to cover the history of flax and flaxseed oil, its journey from being a medicine to a functional food source and its health benefits. There are several ways to eat flaxseed: milled, in the form of oil or added to bakery product. Scientific evidences support consumption of flaxseed for the high content in omega-3, omega-6 rich oil, α -linolenic acid, lignans, high quality proteins and fibers, compounds which are biologically active in the prevention of some chronic diseases such as many types of cancer, diabetes, cardiovascular diseases and cerebrovascular stroke. Furthermore, advantages in flaxseed consumptions are shown in animal nutrition sector and therefore result in healthier food from animal origin. Obesity-related disease conditions have been often treated and/or prevented using many plant materials including flax. Flaxseed fibers form highly viscous solutions upon hydration, which is similar to those observed for other gums. Particularly viscous fibers appear

effective in suppression of hunger). Soluble non starch dietary fibers of flaxseed mucilage are multibranched hydrophilic substances, forming viscous solutions that delay gastric emptying and nutrient absorption from the small bowel.

Bakery products account for around 70% of all consumed cereal products. Their chemical composition, and nutritive and energy values depend on formulation, conditions of dough preparing and further steps of technological process, and additives. Special, regional types of bakery products that are available on the market are either characterized by specific formulations or produced by unique technological processes (e.g. wheat bread rich in dietary fiber and vitamins, bread enriched with cereal bran, crisp bread, pumpernickel and durable bread, also named conserved bread).

Obesity today is out of control. Something must be done about curbing it. One way is to make conquering it a top priority for the health care industry. Individuals aren't alone in being responsible for their obesity, but they are the ones who should head the fight against it. They are the ones who must regain control of their eating food buying and their eating habits. They must stop allowing the modern world and its rush to promote unhealthy food to rule over their dietary habits. The owners of fast food restaurants and other businesses selling and catering to food enthusiasts have one thing in mind, make money. They do this by serving up high caloric and palate-pleasing food and making it available to those who are either too young, too lazy, or too unconcerned to take control of their eating habits. In other words, the very nature of the modern world makes the possibility of obesity possible. Lifestyles have changed drastically from the days when food was not plentiful and most people had to work harder to put food on the table. This in itself took care of much of the calories and there were no excess fat stored to cause panic. Technology and man's inventiveness has created ways in which food is easier to get and no longer is hard, calorie burning labor necessary to get a satisfying meal

Prevalence of obesity is raising more than one million people are overweight with 300 million meeting the criteria for obesity. Obesity is the condition in which excess of body fat has accumulated to the extent that has negative effective on health. Women more than 35 inches considered or men with waist more than 45 inches are at increased risk. Obesity is most commonly caused by a combination of excessive food intake, lack of physical activity and genetic susceptibility, few cases are caused by primarily by gene, endocrine disorder, medication or

mental disorders. Obesity, especially the abdominal obesity on women health is over whelming and indisputable. New product development may be described as improving upon the existing product or producing new type of product .The new product meet the need of the people and also health environmental reasons.

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The objective of the current study is :

To study the acceptability of Flaxseed powder incorporated in masala cookies.

- To study the nutritive value of flaxseed powder.
- To study the shelf life in different packaging material.
- To study the main causes of obesity in women in modern world.
- To popularize the flaxseed masala cookies among obese women.

MATERIALS AND METHODS

Collection of ingredients

The flaxseed and all the ingredients required for preparation of masala cookies was procured from the local market.

Preparation of Flaxseed powder

The flaxseed was washed under running water and sun dried and roasted in medium flame. Roasting id done to remove phytochemicals and raw taste from seeds. The roasted seeds also improve its taste and shelf life. Then the flaxseed was powdered by using grinder.

Formulation of flaxseed incorporated masala cookies

The flaxseed masala cookies was prepared by blending flaxseed powder in wheat flour, ginger garlic paste, green chilly, turmeric powder, chilly powder, asafoetida powder, curry leave, and baking powder and sun flower oil, salt .all the ingredient was mixed well and blended for 5 minutes and kept for resting about an hour .The cookies were molded and baked at 150°C for 15 minutes. The process of preparation of flaxseed masala cookies is depicted in the flow chart (figure1).

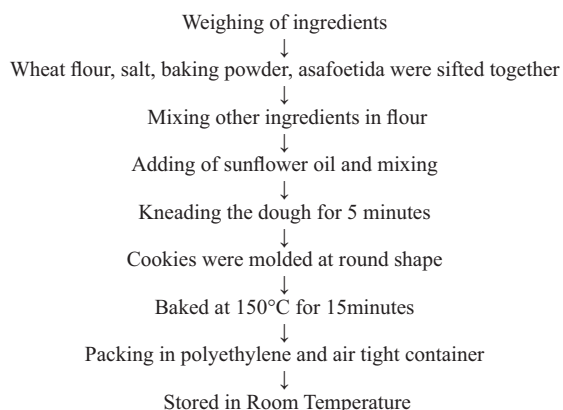


Figure1: Flow chart for preparation of flaxseed masala cookies

Standardization of flaxseed powder in masala cookies

Food standardization is the art of blending or mixing different ingredients in different ratio or proportions to create a standardized recipe .a standardized recipes is one that has been tested and adopted for use and found to produce the same good result and yield every time .when the exact procedure are used and with the same quantity and quality of the ingredients. A recipe would be considered "standard" when it uses "standard measurements.

The proportion of flaxseed powder incorporated in wheat flour in different variation as 5g, 10g, 15g and 20g.All the proportion was kept for sensory analysis. The 20g flaxseed incorporated in wheat flour was most acceptable proportion by the panel. The colour, texture and appearance and taste were most appropriate criteria for acceptability of this proportion.

Experimental Analysis

The flaxseed incorporated masala cookies was subjected to the following analysis

Proximate analysis

The fiber and protein in flaxseed incorporated masala cookies were analyzed by AOAC method.

Sensory Analysis

Sensory qualities of flaxseed incorporated masala cookies like appearance,colour,flavour,taste,texture and overall acceptability were evaluated using score card with five hedonic scale rating by 30 semi trained and trained panelist.

MICROBIAL ANALYSIS

The microbial analysis was done by using serial dilution agar method and plate count method

STATISTICAL ANALYSIS

The observation was tabulated and statistically analyzed. The data were reported as mean and standard deviation.one way ANOVA was carried out to validate if there was any significant difference in sensory attributes of the cookies variation.

RESULT AND DISCUSSION

A.WEIGHT OF FLAX SEED POWDER AFTER PROCESSING.

The weight of flaxseed powder before processing it was 100 Gms. When the flaxseed was cleaned, sun dried and roasted the weight of flaxseed was changed as 99.8gms.when the flaxseed was sundried it did not show much weight changes. While the flaxseed was roasted the moisture content in the flaxseed was reduced.

A. Incorporation of flaxseed powder in masala cookies

The flaxseed powder was blended with the wheat flour in the ratio of 95:5,90:10,85:15,80:20.The four flour blended along with wheat flour were used in the preparation of masala cookies and also other ingredients like ginger garlic, green chilly, turmeric powder, chilly powder, asafoetida powder, curry leaves.

B.Microbial Analysis of flaxseed powder and Flaxseed Incorporated Masala cookies.

The microbial analysis of flaxseed powder and flaxseed incorporated masala cookies ,the Total Plate Count was done ,for 0th day (fresh flaxseed powder),15th day and 30th day was analyzed in which there was no much growth of microorganism growth occur during the storage period. The count of bacterial colony was less and acceptable for consumption. Total plate count was 32,000per gram. In 1981, the Codex Alimentarius Commission adopted the generic approach on sampling plan developed by the International Committee of Microbiological Specification for Foods (ICMSF) cereals, nuts in total plate count should not be more than 50,000 per gram.

B. Nutrient Analysis of flaxseed powder and flaxseed incorporated masala cookies.

In nutrient analysis of fiber and protein was analyzed by the AOAC method. The flaxseed powder and flaxseed incorporated masala cookies were analyzed, in which flaxseed powder the fiber and protein content was 27.3gms and 18.3 gms respectively. In flaxseed masala cookies the fiber and protein content was 29.6gramsand 20grams. Most adults should aim to consume between 25–40 grams of fiber from **high-fiber foods** daily. Eating just two tablespoons of flaxseeds per day will provide about 20 percent to 25 percent of your fiber needs

C. Sensory Analysis of Flaxseed Incorporated Masala cookies

The standard masala cookies with four variations were subjected to sensory analysis to study the acceptability of flaxseed masala cookies. Panel member's analyses food product through properly planned experiments and their judgment are quantified by appropriate statistical analysis. Thirty semi trained panels members including the staff members and students of the department of Foods and Nutrition were selected as panel members. The score card was prepared with

Five point Hedonic rating scale including the criteria of appearance, colour, texture, flavor, taste were measure acceptability of flaxseed incorporated masala cookies.

The samples were presented with 5 digit code marking to obscure the identity of the samples and the order of presentation was randomized. The test time was between 10am 12noon. The standard along with sample coded A to E and presented in a pleasant comfortable atmosphere. The sensory score obtained for flaxseed masala cookies for appearance, colour, flavour, texture, taste and overall acceptability was 4.8,4.8,4.8,4.8,5,5. The hedonic scale was 5, all criteria score was high and the panels was accepted the product.

D. Standardization of flaxseed Masala Cookies

Standardized recipes are an important part of a well-managed food service program. A standardized recipe specifically describes the exact, measurable amount of ingredients and the method of preparation needed to consistently produce a high-quality product. The proportion of flaxseed powder in wheat flour was given in Table I

The proportions of flaxseed powder incorporated in wheat flour in different variations as 5g, 10g, 15g and 20gm. All the proportion was kept for sensory analysis. The 20gm flaxseed incorporated in wheat flour was most acceptable proportion by the panels. The colour, texture and appearance and taste were most appropriate criteria for acceptability of this proportion

TABLE I: PROPORTION OF FLAX SEED POWDER IN WHEAT FLOUR

S.NO	SAMPLE	PROPORTION OF FLAX SEED POWDER
1	A	95:5
2	B	90:10
3	C	85:15
4	D	80:20

E. Packaging of the Flaxseed Masala Cookies

Packaging plays a very important role in quality retention. The present study investigated the effect of polythene pouches and air tight container on quality retention and storage life of flaxseed powder. The sample was packed in polyethylene pouches and air tight container. The sample were packaged and stored in room temperature.

F. Microbial analysis of flaxseed masala cookies in polyethene cover and airtight container.

The flaxseed masala cookies stored in polyethene cover and airtight container in room temperature, there is no microbial inhibition in which it was acceptable for consumption. The microbial analysis was done for 0th day (fresh masala cookies), 15th day and 30th day in which the total plate count method was done. The microbial colonies were counted below 32-35000 per gram. 30 days of storage of flaxseed masala cookies stored in polyethene and airtight containers acceptable and can consumable for human beings. The microbial analysis in polyethene cover and airtight container was shown in Table II.

TABLE II: MICROBIAL ANALYSIS OF FLAXSEED MASALA COOKIES IN POLYETHENE COVER AND AIR TIGHT CONTAINER

S.NO	INCUBATION PERIOD	TOTAL PLATE COUNT	
		POLYETHENE COVER	AIR TIGHT CONTAINER
	0 TH DAY	2x101	2x101
2	15 TH DAY	3x101	3x101
3	30 TH DAY	5 x101	5 x101

G. Sensory Analysis for Stored Flaxseed Masala Cookies

Sensory analysis score of flaxseed masala cookies stored in polyethene cover for 30 days of storage in room temperature. It is observed that the appearance colour flavour texture taste and overall acceptability did not have much variations and remain same during the storage period. During the day 15th and 30th the flaxseed masala cookies showed slight changes in the score for texture and flavour as 4.7 and 4.6 respectively. It is observed that the mean sensory score of flaxseed masala cookies for appearance colour flavour texture, taste and overall acceptability was remain same as 4.8,4.8,4.8,4.8,5 and 5 at the five point hedonic scale and in which was stored in airtight container for the period of 30 days of storage.

H. Popularization of Flax seed Incorporated Masala Cookies

The flaxseed masala cookies were popularized among women who are

obese, through counselling and demonstration made them to encourage in consuming flaxseed masala cookies which is high in fiber and protein can have good benefit on obesity. The women are made aware about the nutritional benefit of flaxseed. For the process of popularization the questionnaire was prepared to check the awareness and acceptability of flaxseed masala cookies among obese women. Flaxseed incorporated masala cookies showed higher acceptability of the product than the standard masala cookies. The 20 obese women accepted the flaxseed incorporated masala cookies and only 10 obese women accepted the standard masala cookies. The colour, appearance, taste, flavours and texture was accepted by them.

During the popularization of flaxseed masala cookies among these 20 obese women, snacking in between meal was the main problem. They liked to have fried items and biscuits and cookies and also the high calorie diet and less physical activity was shown during this study. Among these 20 obese women the cookies was daily tea time snack. The flaxseed masala cookies could help them in which it has high protein and fiber which can play great role on obesity and also this flaxseed masala cookie can have in between the meals.

CONCLUSION

From this study it can be concluded that flaxseeds powder can be incorporated in wheat flour of cookies up to 20% level which is highly acceptable by the consumers. These products can be added in our daily diet and are excellent source for an addition of ingredients like flaxseed rich in protein and fibre. These types of ingredients can be easily adopted by bakeries and also people who are concerned of health. To prepare such value added health food required by a particular segments of population who are prone to obesity and also consider as a medicine.

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