



(RESEARCH ARTICLE)



Studies on formulation, standardization and sensory evaluation of chia seed (*Salvia hispanica L*) cookies

Ranjeet chunilal Kokani * and Sachin Dadabhau Lamkhade

College of Food Technology, Saralgaon Tq.Murbad Dist. Thane 421401 Affiliated to Dr.B.S.K.K.V.Dapoli (Maharashtra), India.

GSC Advanced Research and Reviews, 2023, 17(02), 152–156

Publication history: Received on 06 October 2023; revised on 14 November 2023; accepted on 17 November 2023

Article DOI: <https://doi.org/10.30574/gscarr.2023.17.2.0435>

Abstract

Cookies are not considered as staple food as in bread, but may be feasible fiber carriers because of their long shelf life and thus enable large scale production and widespread distribution .In many countries, cookies are prepared with fortified or composite flour to increase its nutritive value.Chia seeds are the richest source of protein, fiber, omega-3 fatty acids and packed with antioxidants. Another key feature of chia seeds is that it does not contain gluten. Chia can help cut cravings, balance blood sugar levels, improve cardiovascular diseases, all cancer types, allergies, lower cholesterol, and triglycerides blood pressure and can promote weight loss. Prepared products proximate analysis as Moisture content in Chia seeds cookies was found to be 9.32% and fat content in concentration 23.12% it contains higher amount of carbohydrate content than other parameters 68.50 % Ash content of cookies was found to be 2.28 %. It content protein 8.75 % and energy value is 517.08 kcal respectively. Chia seed cookies store at 90 days at room temperature. These all chemical parameters were found more or less similar with result found by AOAC 1990 standard method.

Keywords: Chia seed; Omega-3 fatty acid; Quality analysis; Storage study

1. Introduction

The bakery industry is growing very fast and the products are increasingly becoming popular among all the sections of the people. Among the ready to-eat snacks, biscuits possess several a reactive feature including wider consumer base, relatively long shelf-life, more convenient and good eating quality. Development of fortified biscuits or other composite flour bakery products is the latest trend in the bakery industry. Most of the bakery products are used as a source for incorporation of different nutritionally rich ingredients for their diversification (Hooda and Jood, 2005).

Cookies are not considered as staple food as in bread ,but may be feasible fiber carriers because of their long shelf life and thus enable large scale production and widespread distribution .In many countries ,cookies are prepared with fortified or composite flour to increase its nutritive value (Aziah et.al.,2012).

Today, we find that the people are becoming more and more aware about their health and various problems related to it. Thus, with changing lifestyle and the changing mindsets of people they are also making a trend toward eating nutritious as well as healthy food. Bakery products have become popular among different cross sections of the population due to an increased demand for convenience foods. Bread and cookies accounting for 80% of total bakery product produced in the country. (Katke S.D. et.al. 2016).

* Corresponding author: Ranjeet chunilal Kokani

Now-a-days, consumers are much more concerned about their health and demand the food products conferring health benefits with reduced calories, low sugar content, high protein and dietary fiber. Consumers also look for the products that are more natural-like. The low calorie products may be developed by adding bulking agents possessing high moisture absorption ability resulting in the reduction of calories by one-third. Due to the change in life-style, evidences of diseases such as high blood pressure, diabetes, cardiovascular diseases (CVDs) and similar other diseases is on the rise. Also the growing population with depleting sources of food resulted in malnutrition which is of great concern. (Naik H. R.2015).

Chia seeds are the richest source of protein, fiber, omega-3 fatty acids and packed with antioxidants. Another key feature of chia seeds is that it does not contain gluten. Chia can help cut cravings, balance blood sugar levels, improve cardiovascular diseases, all cancer types, allergies, lower cholesterol, and triglycerides blood pressure and can promote weight loss. Chia seeds contain all the essential amino acids, partially lysine, leucine, isoleucine, and valine. Chia seeds are rich in the dietary fiber of branched-chain polysaccharides, which absorb more water and allow slower sugar absorption in the body.

Chia seeds have a great beneficial effect in humans because of their rich fiber, omega-3 fats, protein, vitamins, and minerals. For example, one ounce (28 gm) of Chia seeds contains about: (137 calories), (12.3 gm carbohydrates), (4.4 gm protein), (8.6 gm fat), (10.6 gm fiber), (0.6 milligram manganese) (30 percent DV), (265 mg phosphorus) (27 percent DV), (177 mg calcium) (18 percent DV), (1 mg zinc) (7 percent DV), milligram copper (3 percent DV), (44.8 mg potassium) (1 percent DV) (Rachael Link). Cookies are to be the major bakery product. Among the different bakery products, cookies constitute the most popular group. Cookies are confectionery dried product, having low moisture content. Cookies have nutritive value, palatability, compactness, and convenience. It has low moisture content than cakes and bread; cookies are safer from microbiological spoilage and have a long shelf-life. Cookies are a lot more loaded in terms of ingredients and flavors as compared to biscuits. Cookies can differentiate from biscuit by their moisture and texture of the product. Biscuit is not as dense and sugary as a cookie; it is light in texture with a crusty exterior. Chia seed enriched cookies have enhanced with added nutrients through chia seed and date syrup. Chia seed enriched cookies are the good source of protein, fiber, omega-3 fatty acids, and antioxidants. Chia seed enriched cookies can be a good choice instead of regular cookies as it is healthy and controls obesity. Obesity is becoming a common threat today because of lifestyle and consumption pattern and habits. Chia seed enriched cookies are ready to eat the product which needs none time for preparation. It can consume directly anytime anywhere. Chia seed enriched cookies are a best healthy way to satisfy hunger. Dates syrup is rich in calcium, sulfur, iron. (Divya, 2012).

Medical and epidemiological studies have demonstrated that ω -3 fatty acids are essential nutrients and play a role in human health for the prevention of cardiovascular diseases, being antithrombotic, anti-inflammatory, antiarrhythmic, and favoring plaque stabilization. Therefore, the intake of foods containing high amounts of α -linolenic acid is recommended. Also, an important ratio of unsaturated fats to target in the human diet is that of ω -6: ω -3 fatty acids. The ideal ratio ranges from 1:1 to 3:1, but generally in the western diet, it is much higher, even in vegetable oils, where the content of ω -6 fatty acids is high. The ratio is lower than 1 in chia (Ixtaina et. al., 2011).

A soothing effect on the digestive tract the creation of a barrier for enzymes, therefore a slowdown and reduction of the breakdown of complex carbohydrates into sugars A safety sensation due to the increase in the volume of the hydrates' mass. An increase in viscosity of the bolus which then proceeds slowly in the intestinal tract, and this makes digestion more efficient and prolongs the feeling of satiety. Soluble fibers forming the gel act as probiotic and regulate blood sugar and cholesterol levels (Gentry et al. 1990; Capitani et. al., 2012).

Chia seeds contains phytochemicals like myricetin quercetin kaemferol cuteleic acid flavonal glycosides chlorogenic acid the dry chia seeds contains 8.8% of phenolic contains various active ingredients including essential fatty acid the tiny chia seeds are rich in various important chemical componenets (Capitani et. al., 2012).

2. Material and methods

2.1. Ingredients, Chemical and Equipments

Raw materials required during present investigation were procured from local market such as chia seeds, butter, cocoa powder, milk powder, sugar, Wheat flour etc. The raw material were cleaned and made free foreign matters. The equipments and machineries like tray dryer (for drying chia seeds), domestic mixer (for grinding of dried chia seeds, sugar), required in the present investigation were used, these equipments were available in the College of Food Technology, Saralgaon, Thane (MH).

2.2. Physical and Chemical Analysis

Chemical Analysis such as moisture is determined by using hot air oven, fat is determined by Soxhlet apparatus and protein is determined by using Kjeldahl's method. Acidity is determined by using titration method and pH is measured by digital pH meter. All quality parameters were determined by AOAC (2000).

2.3. Organoleptic Evaluation

Prepared product were evaluated for sensory characteristics in terms of appearance, color, flavor, aftertaste, texture and overall acceptability by 10 semi-trained panel members comprised of academic staff members using 9- point Hedonic scale. Judgments were made through rating the product on a 9 point Hedonic scale with corresponding descriptive terms ranging from 9 'like extremely' to 1 'dislike extremely'. The obtained results were recorded in sensory score card.

2.4. Statistical Analysis

The analysis of variance of the data obtained was done by using completely randomized design (CRD) for different treatments as per the method given by Panse and Sukhatme (1967). The analysis of variance revealed at significance of $p < 0.005$ level S.E and C.D. at 5 percent level is mentioned wherever required.

2.5. Formulation for preparation of chia seed cookies

Cookies prepared with varying levels of chia seed flour was investigated. The formulation was made by varying level of Chia Seed Flour. 20%, 30% and 40% Chia seed flour used for preparation cookies and formulated them into other ingredients and prepared the Cookies. Among all the formulation 40% Chia Seed flour sample was selected for the preparation of cookies.

2.6. Preparation of Chia Seeds Cookies

For preparation of Chia seed Cookies all the dry ingredients are mixed in the proper proportion such as the wheat flour, chia seed flour, baking soda, cocoa powder, sugar and milk powder. Then the butter is mixed properly with the all of the dry ingredients. Mixing should be properly done to avoid lumps formation. As it will destroy the overall texture of the cookies, prepared dough is allowed to rest for the 15 min. all the dough and cut it in desired shapes and size. All the cookies should be same in shape and size for uniform baking of cookies. Grease the tray before keeping the cut pieces of cookies to avoid sticking of cookies and easy removal. The baking is done at the temperature of 160°C-180°C for 20min-25min. after that cookies are cool at room temperature and store at room temperature.

3. Results and discussion

Table 1 Physicochemical Properties of Chia seeds cookies

Parameters	Chia seeds cookies(T3)	Parameters	Chia seeds cookies(T3)
Colour	Brown	Ash	2.28 %
Length	7.4 cm	Moisture	9.32 %
Width	2.6 cm	Fat	23.12 %
Thickness	1.1 cm	Protein	8.75 %
Weight	18 gm	Carbohydrate	68.50%
		Energy	517.08 Kcal

It was evident from above Tabulated that the physical properties of selected sample were colour Brown due to cocoa powder which was determined by visual observation. Length (7.4cm), width (2.6cm) and thickness (1.1cm) of cookies were measured by using Vernier caliper. Weight of one cookies sample was 18gm which was measured by weighing balance. The chemical properties analyzed for selected sample were that moisture content in Chia seeds cookies was found to be 9.32% and fat content in concentration 23.12% (Raheem et.al.,2016).It contains higher amount of carbohydrate content than other parameters 68.50 % (Giram et. al., 2017) and Ash content of cookies was found to be 2.28 %. It content protein 8.75 % (Giram et. al., 2017) and energy value is 517.08 kcal respectively. These all chemical

parameters were found more or less similar with (Giram et. al., 2017).all the chemical analysis results found by AOAC 1990 standard method.

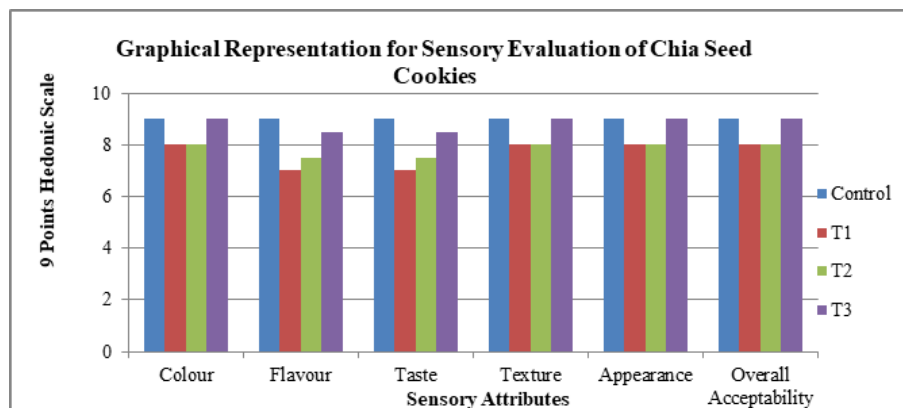


Figure 1 Graphical representation of Sensory Evaluation of Chia Seeds Cookies

For preparation of chia seed cookies varies formulation were taken in that 40g of chia seeds flour was selected for preparation of cookies. Formulated sample was selected through 9 point hedonic scale and all the Panels are Experience College staff. In all prepared sample T3 which gives better flavor and taste as compared to T1 and T2 which contain 20 and 30 g of chia seeds cookies. All the panels' gives best and good points to sample T3 than other sample. In all the parameter T3 gives best overall acceptability. T3 gives more consistency and nutritive value than T1 and T2 as T3 it contain 40 g of chia seeds. T3 chia seeds powder cookies preparation was organoleptically acceptable and used for further study

4. Conclusion

It concluded that prepared chia seed cookies sample T3 containing 40gm shows highest acceptability by panelist member among rest. It is observed that sample T3 is rich in all the nutrients and also micronutrients and lower in fat as compare to control sample T0. Due to chia seed prepared cookies nutrias than marketed control sample. Thus it may be concluded that Chia Seed Flour can be useful for preparation of Cookies.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

- [1] Abdul Hamid A, Luan Y. S.(2000) Functional properties of dietary fiber prepared from defatted rice bran. Food Chemistry.; 68:15-19.
- [2] Ahmed M, Ting I. P. and Scora R. W. (1994) Leaf oil composition of *Salvia hispanica L.* from three geographical areas. J Essent Oil Res 6:223–228.
- [3] Capitani MI , Spotorno V, Nolasco SN, Toma's MC (2012) Physicochemical and functional characterization of by-products from chia (*Salvia hispanica L.*) seeds of Argentina. LWT—Food Sci Technol 45:94–102.
- [4] Chelladurai C., Ayushi A. Pandey, Sonal A., Panmand and Nikam S. (2019) Development of innovative bakery product chia seed enriched cookies. International Journal of Food Science and Nutrition 4(2): 19-23.
- [5] Divya, M. (2012). Biscuit industry in India – an overview Gentry H. S., Mittleman M., Esposito F, Arlotti G, Bonifati A. M., Napolitano A, Vitale D and Fogliano V. (2005). Antioxidant activity and dietary fiber in durum wheat bran by-products. Food Research International . 38:1167-1173.

- [6] Gentry H. S., Mittleman M. and McCrohan P. R. (1990) Introduction of chia and gum traga canth in the US. In: Advances in new crops. Proceedings of the first national symposium 'New crops research, development, economic, Indianapolis, IN, USA, 23–26 October 1988. Timber, Portland , pp. 252–256.
- [7] Ixtaina V. Y., Nolasco S.M. and Tomas M. C. (2011). Physical properties of chia (*Salvia hispanica* L.) seeds. Indian Crop Production 28(3):286–293.
- [8] McCrohan PR (1990) Introduction of chia and gum tragacanth in the US. In: Advances in new crops. Proceedings of the first national symposium 'New crops research, development, economics', Indianapolis, IN, USA, 23–26