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Chia seed: A magical medicine

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Abstract

Now a days, people are looking for the foods with disease remedy. For this purpose, chia seed is best suitable food ingredient. The significance of chia seed and its uses are clearly mentioned in the following text. Keeping in view of its constituents, it can be used a nutraceutical or functional food. Utilization of chia seed in various food products are increasing tremendously in everyday life.

Keywords: chia seed, nutraceutical, functional food

Introduction

Salvia hispanica L. or chia is an annual plant belonging to the Lamiaceae family native to Mexico and Guatemala [16]. The name *Salvia* originates from the Latin word *Salvare*, meaning 'the healer' [15]. Chia seeds are high in dietary fiber (34.6%) and the majority of fatty acids present in chia oil are α -linolenic (ALA) (64% of total oil), linoleic (LA) (21% of total oil), oleic, stearic, and palmitic acids [11]. In addition, it contains natural antioxidants such as phenolic glycoside-Q and K, chlorogenic acid, caffeic acid, quercetin and kaempferol [21] which protects consumers against some adverse health conditions, such as protection against some cardiovascular diseases and some types of cancer; as well as vitamins and minerals [3, 4, 12]. In 2009, it was approved as novel food by the European Parliament and the European Council [9]. Recently, chia has regained its popularity by becoming one of the main oil sources that contains high levels of PUFA. Chia, which used to be the major food crop of the indigenous peoples of Mexico and Guatemala, is now widely cultivated and commercialized for its (omega) ω -3 α -linolenic acid (ALA) content and antioxidant properties. Really, chia seed fits for the definition of nutraceutical, it contains vital nutrients that provide protection against chronic disease [17].

Health benefits of Chia seed

Chia seed is rich sources of dietary fiber and Omega-3 fatty acids especially α -Linolenic acid. Usually fish oil contains higher levels of omega-3 than any other oil seeds available [7, 14, 18, 22]. Chia oil, however, has a higher percent of omega-3 per 100 g than cod liver, herring, salmon and sardine oils [22]. Presence of these components in chia seed may reduce the risk of some types of cancer and coronary heart disease.

Food uses of chia

Various forms of chia can be used in preparation of different foods. Unlike, other oil seeds such as flax, with high concentrations of ALA, contain anti-nutritional and vitamin antagonistic factors. Chia seeds are not reported to have these anti-nutritional factors [5].

1. Whole seed: Whole seed can be consumed as such or hydrated. Consuming soaked chia seed results in cooling effect to body. Seeds can also be added in fruit juice/sugar solutions. Fruit juices containing chia seeds are commercially available in the local markets. Agua de chia is a Mexican drink prepared by soaking chia seeds in a mixture of water and lemon juice [19].
2. Chia oil: Extraction of chia oil by using various methods like soxhlet method and etc. Furthermore, chia oil is a good source of omega-3 for commercial food applications because it can be added straight to products without flavour alterations, commonly required in products containing added fish oil [5].
3. Chia seed flour: The chia seeds were deoiled and milled to 150 μ m in the manufacture of commercial chia flour [11]. Resultant flour can be used in bakery products like cakes, cookies [24] and chips [10] for increasing the nutritional value of the product.
4. Mucilage: Mucilage extraction was performed at different seed: distilled water ratios, pH and temperature conditions [20]. Different water to sample ratios (1:15, 1:20, 1:25, 1:30, 1:35 and 1:40) were used for gel extraction. Chia seeds or flour mixed with deionized

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water using an overhead mixer RW 20 DZM.n IKA labortechnik, Staufen, Germany) at 1920 rpm for 3 h. The mixture was then centrifuged using an Eppendorf 5810R centrifuge (Eppendorf, Hamburg, Germany) at $3220 \times g$ for 50 min at 20 °C to separate the gel. The top layer (excess water) was removed, and the gel (middle) layer was collected, the seeds settled at the bottom ^[11]. Fresh mucilage can be added as stabilizer in ice cream ^[8] and other frozen desserts. Like guar gum and gelatin, chia

seed mucilage can be used as thickener in various stages of food preparation. Commercial ice creams with incorporation of chia seed gel are introduced and launched by some companies in Karnataka state.

- Chia Mucilage Powder: Mucilage can be dried by various means of drying techniques like spray drying, freeze drying and oven drying. Powder can be used in preparing different health & energy drinks. Powder can also be reconstituted as fresh gel.

Table 1: Chemical composition of chia seed, chia flour, chia seed gel, and chia flour gel^[11]

Sample Component* dry basis (%)	Chia seed	Chia flour	Chia seed gel	Chia flour gel
ALA	11.52 ± 1.03	2.59 ± 0.58	0.26 ± 0.05	2.33 ± 0.11
LA	2.55 ± 0.41	0.81 ± 0.11	0.10 ± 0.03	0.81 ± 0.01

Table 2: Dietary fiber fractions of chia (*Salvia hispanica*) compared to other fiber sources (g/ 100 g d.b.)

Component	Chia FRF ⁽¹⁾	Jack bean FRF ⁽⁶⁾	Passion fruit FRF ⁽¹³⁾
Total dietary fiber	56.46 ± 0.35	55.88	63.25
Insoluble dietary fiber	53.01 ± 0.28	52.49	46.75
Soluble dietary fiber	3.45 ± 1.62	3.38	16.50

Table 3: Fatty acids profile of chia oil

Fatty acids Composition (%)	Chia oil ⁽²³⁾	Ayerzay Coates ⁽²⁾	Craigy Sons ⁽¹²⁾
Saturated fatty acids (SFA)			
Mirist C14:0	0.04 ± 0.00	0.0	0.1
Pentadecaenoic C15:0	0.02 ± 0.00	NA	NA
Palmitic C16:0	7.47 ± 0.09	6.5	6.7
Palmitoleic C16:1	0.06 ± 0.00	0.1	0.1
Heptadecaenoic	0.05 ± 0.00	NA	0.2
Stearic C18:0	0.29 ± 0.07	2.9	3.0
Arachidic C20:0	0.15 ± 0.03	0.3	0.3
Behenic C22:0	0.06 ± 0.06	NA	0.1
Monounsaturated fatty acids (MUFA)			
Oleic C18:1	2.43 ± 0.03	7.2	6.9
Gadoleic C20:1	0.03 ± 0.01	0.1	0.1
Polyunsaturated fatty acids (PUFA)			
Linoleic C18:2 (omega-3)	20.40 ± 0.09	20.3	18.8
α -Linolenic C18:3 (omega-3)	68.52 ± 0.02	62.0	58.8
γ -Linolenic C18:3 (omega-6)	0.31 ± 0.02	NA	0.1
Eicosatrienoic C20:3	0.01 ± 0.00	NA	0.1
Araquidonic C20:4	0.13 ± 0.10	NA	NA
Docosahexaenoic C22:6 (omega-3)	0.05 ± 0.029	NA	NA

Conclusion

Chia seed is excellent source of omega-3 fatty acids like Linolenic acid, α -Linolenic acid and dietary fiber as a oil seed. In addition to good nutritional composition of chia seed, can also be used a functional food or a nutraceutical which are having potential health benefits. Variety of foods can be prepared by incorporating chia seed and its constituents.

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