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Short Communication

Chia - The Less Known Plant of Omega 3 Fatty Acid

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Salvia hispanica L., commonly called as chia is the rich plant source of ω-3 fatty acids and other medicinal properties. It is native Mexico and Guatemala (Cahill 2004) belong to Lamiaceae family. It is being extensively used for preparation of functional foods, supplements and nutraceutical products of many health benefits.

Chia is a herbaceous plant that has been utilised for thousands of years for therapeutic purposes. It is short duration crop completes its life cycle between 100-110 days with limited irrigation facility. It can be cultivated in tropical to semi-arid conditions with short day conditions. In India crop is being cultivated in parts of Karnataka around Mysore district by group of farmers. Chia seeds are now used as ingredients or supplements to a variety of dishes, including baked goods, muesli, dairy drinks, and fruit salads [1]. In addition, it also been used as thickeners in soups and sauces. The focus of this article is to highlight the potential benefits of chia seeds in the food industry, directing on their chemical composition and health-promoting properties.

Figure 1: Chia plant.

Figure 2: Chia seeds (white and black).

Figure 3: Chia plant showing two types of flower a) white flower and b) blue flower.

Chia as medicine

- Reduces the risk of cardiovascular diseases due to high lenolenic acid
- Reduces blood sugar level due to high fibre content

- Reduces constipation due mucilage content on seeds

The gel is formed in the mouth when seeds of chia are chewed and it will continues inside the stomach too. This gel has important effects on nutrition and health such as

- It has a calming effect on the intestines.
- It will act as a barrier for enzymes, hence, slowdown and reduces the breakdown of complex carbohydrates into sugars in the blood.
- The rise in the volume of the hydrates' mass causes a satiety sense.
- An increase in the viscosity of the bolus, which therefore moves slowly through the intestinal track, allowing for more effective digestion and a longer sense of satiety [2].
- The gel's soluble fibres function as probiotics, regulating blood sugar and cholesterol levels.

Nutritional properties of chia

- Chia seeds contain good amount nutrients required for human diet. Seeds of chia contains high dietary fibre and lipids, ~ 30-34 g dietary fibre, [3].
- Seeds are predominated by polyunsaturated fatty acids (PUFA), predominant alpha linolenic acid (ALA), which accounts for 60% all fatty acids and few other fatty acids such as linoleic, oleic and palmitic acids accounts for lower quantity.
- The most health benefit of chia seeds in comparison to other oilseeds is high proportion of omega-6 to omega-3 acids, which is ~ 0.3:0.35.
- Further, seeds are rich source of amino acids, such as glutamic and aspartic acids, alanine, serine and glycine.
- In addition, seeds are free of gluten, thus it may be provided to celiac patients.
- Moreover, chia seeds supply many minerals, with phosphorus (860 - 919 mg/100 g), calcium (456-631 mg/100 g), potassium (407 - 726 mg/100g) and magnesium (335 - 449 mg/100 g) found in greatest amounts [4].
- Seeds also contains vitamins, mainly vitamin B1 (0.6 mg/100 g), vitamin B2 (0.2 mg/100 g) and niacin (8.8 mg/100 g) [4].
- Besides, seeds are potential source of polyphenols *viz*., gallic, caffeic, chlorogenic, cinnamic and ferulic acids, quercetin, kaempferol, epicatechin, rutin, apigenin and p-coumaric acid.

	Chia seeds	Flax seeds
Nutrient properties [4]		
Total energy	486.0 K cal	450 K cal
Carbohydrates	42.1 g/100g	29 g/100g
Protein	16.5 g/100g	20 g/100g
Dietary fibre	34.4 g/100g	28 g/100g
Total lipids	30.7 g/100g	41 g/100g
Fatty acids [6]		
Saturated fatty acids	8.6	7.87
Monounsaturated fatty acid	10.4	18.5
Poly unsaturated fatty acid	80.4	73.6
Ratio of omega6: Omega 3	0.35 (1:2.9)	0.27 (1:3.8)
Omega 3 (Linolenic acid (C18:3)	20.3	15.3
Omega 6 (Linoleic acid (C18:2)	59.7	58.2

Table 1: Nutritive value of chia in comparison with fax seeds.

Chia in food industry

- Seeds have polysaccharide coating on seeds make them more hydrophilic in nature.
- Seeds are being used as egg and fat alternatives in baked
- Chia seeds can absorb water as much as 12 times greater than their seed weight. They provide food with characteristic consistency.
- Chia seeds are currently utilised whole, crushed, as well as in the form of gel and oil. In baked goods, the gel of chia seeds can be utilised instead of oil or eggs. This method allows items to have lower calorie and fat content.
- In the case of baked goods, the finished products contains more omega-3 acids, which are important biological elements for human health, and this gel might replace up to 25% of oil or eggs in cakes.
- In [5] proposed [6] aking gluten-free fresh pasta by combining chia seeds and mucilage with rice flour. They showed that a 10% mucilage or chia seed concentration resulted in a nutritious and healthy gluten-free pasta with cooking qualities comparable to commercial products, as seen by its firmness.
- Chia seeds can be used to replace emulsifiers and stabilisers in ice cream manufacture.
- A variety of chia-fortified items are available on the market, including bread, cookies, pasta, ice cream, yoghurt, sausages, and even syrup liquids.

- It is evident from the research that physical and technical properties of food doesn't changes when chia is used as fat or egg substitute in food products. Chia can be a potential crop for food industry, nutraceuticals and cosmetics along with many medicinal properties. These seeds can be consumed directly or by value addition in the form of bakery products, soft drinks, ice creams, fruit salads etc. makes them to retain their nutritional values as such. Crop can be cultivated in Indian conditions with limited irrigation and also poor soils in semi-arid and tropical conditions also.

Bibliography

1. Munoz LA., *et al.* "Chia seed (*Salvia hispanica*): An ancient grain and new functional food". *Food Research International* 29 (2013): 394-408.

2. Capitani MI., *et al.* "Physicochemical and functional characterization of by-products from chia (*Salvia hispanica* L.) seeds of Argentina". *LWT- Food Science and Technology* 45 (2012): 94-102.

3. Marineli R., *et al.* "Antioxidant potential of dietary chia seed and oil (*Salvia hispanica* L.) in diet-induced obese rats". *Food Research International* 76 (2015): 666-674.

4. USDA National Nutrient Database for Standard Reference (2019).

5. Menga V., *et al.* "Gluten-free pasta incorporating chia (*Salvia hispanica* L.) As thickening agent: An approach to naturally improve the nutritional profile and the *in vitro* carbohydrate digestibility". *Food Chemistry* 221 (2017): 1954-1961.

6. Ciftci ON., *et al.* "Lipid components of flax, perilla, and chia seeds". *The European Journal of Lipid Science and Technology* 114 (2012): 794-800.