

## Short Communication

# Analysis of Chia Seed' –Physiochemical and Proximate Analysis

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## Abstract

Chia Seed one of nature superfood, little gems swell to keep feeling fuller for longer, low in calories, and can be adapted in flavour. Chia gel can be easily extracted and have great potential in food product development. The gelling of the seeds as combination of soluble and insoluble fibre slow the conversions of starches into sugars when eaten. The swelling and gelling of the seeds also helps with digestion through the colon. The seed contain from 25% to 40% oil with 60% of comprising omega-3 Alpha Linolenic Acid and 20% of omega-6 Linoleic Acid. Chia, the richest plant source of complete protein and packed with anti-oxidants, great for banishing free radicals. The tiny seed good aids for digestion, especially in the hotter climates and reduces body temperature, also assist in controlling the appetite and regulating blood sugar levels. Chia means strength and powerful nutritional punch, are loaded with fiber, protein, fat and various micronutrients. Due to these properties, nutritive and physiochemical characteristics of chia was analysed. A common dosage recommendation is 20 grams of soaked chia seeds twice per day.

**Keywords:** Water absorption capacity, polysaccharide content and omega-3 fatty acid.

## Introduction

Chia is an edible seed that comes from the desert plant “Salvia Hispanica” belonging to the mint family. Chia means strength and used the tiny black and white seeds as an energy booster. Chia seeds are an unprocessed whole grain food that can be absorbed by the body as seeds<sup>1</sup>. Chia seeds are nutrient “power house” loaded with healthy omega-3 fatty acids, fiber, poly unsaturated fatty acids, and protein-including all essential amino acids, calcium and several other minerals. Chia seeds when placed in water produce a gel, this gel has good water binding capacity, oil holding capacity, viscosity and emulsion activity. It can be easily extracted and have great potential in food product development as a thickener, emulsifier and stabilizer in frozen foods. Chia is one of the highest sources for omega-3, which is essential for maintaining healthy cholesterol level, brain development, immune system and it has anti-inflammatory effect. It makes a nutrient breakfast that leaves one feeling

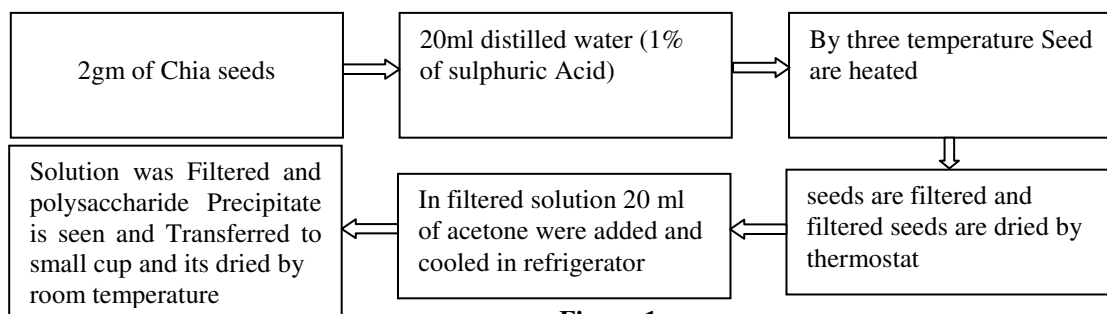
“fuller” and without hunger until lunch time, that can be helpful in preventing or controlling diabetes. Regular consumption of chia seeds prevents signs of ageing, skin diseases, improve metabolism, lower LDL, triglycerides and increase HDL Cholesterol level and also make death of tumour cells<sup>2</sup>.

## Materials and Methods

**Selection of Chia seeds:** For the present study the chia seeds are purchased from standard health food stores – Nilgiris.

**Physical Analysis of Chia Seeds:** The water absorption capacity of chia seed was carried out by “swelling index” method.

**Chemical Analysis of Chia Seeds:** To determine the chemical characteristic of chia seeds, the polysaccharide content was analyzed.



**Figure-1**  
Extraction of Polysaccharide Content in Chia Seeds



**Figure-2**  
**Extracted Polysaccharide Content of Chia Seeds**

**Nutrient Analysis of chia seeds:** The experimental procedure for determination of nutrient composition of chia seeds was carried out by AOAC gravimetric method. The chia was milled to the particle size of 0.5 – 1 mm in a Wiley mill. The dry matter content of chia is determined as the weight after drying of 5 hour at 105°C. Extraction of Liquidsis recommended for chia containing more than 5 percent of lipids to facilitate the subsequent removal of free sugars by ethyl alcohol extraction. Add 50 ml of boiling 80 percent ethyl alcohol, stir well and centrifuge at 2000 rpm for 5 minutes. The nutrient content of chia is to be estimated, and then collected the ethyl alcohol extract quantitatively.

**Results and Discussion**

**Analysis of Chia Seed: Physical Analysis of Chia Seed:** Water absorption capacity is indicative of a structure aptitude to spontaneously absorb water when placed in contact with a constantly moist surface or when immersed in water. The raw chia seed absorb 10 – 12 times their volume in water<sup>3</sup>.

**Table-1**  
**Water Absorption Level of Raw Chia seed.**

Types of water	% of Increase volume	% of Increase weight
Normal water in room Temperature	100	92
Warm water in 27°C	70	89
Boiling water in 100°C	60	90

The table illustrated that the water absorption capacity was higher in normal water when compared to warm and boiling water. The higher value of water absorption capacity in normal water may be due to the protein present in the seeds, which may have a large number of exposed hydrophilic sites, when interact with normal water in room temperature<sup>4</sup>.

**Chemical Analysis of chia seed:** The polysaccharide content of chia seed in different time period and heated at various temperatures was shown in the Table-2.

**Table-2**  
**Extraction of polysaccharide content of chia seed**

Temperature	Time (Hour)	Extracted Polysaccharide precipitate (gm)
60°C	1	0.83
	2	0.13
	3	0.07
	4	0.06
70°C	1	0.3
	2	0.24
	3	0.25
	4	0.33
80°C	1	0.21
	2	0.26
	3	0.32
	4	0.37

The data exhibited that the polysaccharide precipitate of chia was higher in one hour at 60°C when compared to other time period. When temperature and time increased, the amount of polysaccharide content was decreased.

The Polysaccharide precipitate obtained from chia seed is wide potential use in the variety of industrial applications, especially in certain foods and food preparation<sup>5</sup>.

**Proximate analysis of chia seed:** The proximate analysis of chia seed was illustrated in the Table-3.

**Table-3**  
**Proximate content of chia seed**

Nutrients (100gms)	Chia seed (%)
Protein	21.52
Carbohydrates	40.89
Fat	24.83
Omega -3, fatty acids	17.32
Soluble fiber	-
Insoluble fiber	49.47
Energy (Kcal)	473.11

Chia seed contain higher amount of protein (21.5%) when compared to other food items, wheat (11.8%), Oats (13%), Barley (11.5%), rice (6.8%), and corn (11%)<sup>6</sup>. The average protein content varies from 15 to 23% according to the location when the seeds have grown<sup>7</sup>.

The Total fat content of chia seed was 24.8% off which 17.3% contains omega -3 fatty acids. Omega – 3 fatty acids are helpful in the prevention and management of hyperlipidemia, hyperglycemia and hypertension<sup>8</sup>.

The Insoluble dietary fibre of chia seeds ranges between 23 to 50% .In the present study, the insoluble dietary fibre content of chia seed has nearly 49.5% which is capable of retaining water several times of its weight during hydration and thus provides bulk and prolongs the gastro intestinal transit time.

Increased gastro intestinal time is directly related to gradual increase in post-prandial glucose levels and decrease in insulin resistance over a period of time<sup>9</sup>.

## Conclusion

Chia seed is a good choice to maintain a balanced serum lipid profile. For vegans, it is a good substitute because it contains omega-3 fatty acids like EPA and DHA are the type derived from oily fish and fish based supplements.

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