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Evaluation of Phytochemicals Analysis, Medicinal Properties and Nutritional Value of Sesame Seeds (*Sesamum indicum*.L)

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Article history: Received 1 July 2015, Revised 1 August 2015, Accepted 18 August 2015, Published 22 August 2015.

Abstract: The present investigation was carried to find out the evaluation of Phytochemicals analysis, medicinal properties and nutritional value of sesame seeds (*Sesamum indicum*.L). Phytochemicals such as, alkaloids, saponins, tannins, glycosides and flavonoids are present in sesame seeds. The mineral content and phytochemical of sesame seeds cure various diseases like, diabetes, anemia cardiovascular health, anti-cancer, digestive health, rheumatoid arthritis, respiratory health, protection from radiation damage, bone health, oral health, anxiety and lower cholesterol.

Keywords: Sesame seeds, Phytochemicals, Medicinal properties.

1. Introduction

Sesame seed is one of the oldest oilseed crops known, domesticated well over 3000 years ago. Sesame has many species, most being wild and native to sub-Saharan Africa. *Sesamum indicum*, the cultivated type, originated in India. (Raghay *et al.*, 1990). Sesame is highly tolerant to drought like conditions, and grows where other crops may fail. Sesame is drought tolerant, but as with every crop will do better with more moisture. There have been many cases where sesame has done well in fields with low or no fertility, but in coming back to the same field the following year will not do as well. In

analyzing the cropping history of that field it was found the previous crops were shallow rooted and it is hypothesized that the sesame roots went down and found nutrients that had leached lower down into the soil. (Ray Hansen, 2011).

Kingdom: Plantae

Order: Lamiales

Family: Pedaliaceae

Genus: *Sesamum*

Species: *indicum*

Sesame requires well-drained sandy soil and tropical environment to flourish. It grows about 5 feet in height and bears plenty of pink-white foxglove type flowers. The pods appear soon, containing white, brown, or black seeds depending upon the cultivar type, arranged in rows inside. Sesame fruit is a capsule, normally pubescent, rectangular in section and typically grooved with a short triangular beak. The length of the fruit capsule varies from 2 to 8 cm; its width varies between 0.5 to 2 cm, and the number of loculi from 4 to 12. The fruit naturally splits open to release the seeds by splitting along the septa from top to bottom or by means of two apical pores, depending on the varietal cultivar. The degree of dehiscence is of importance in breeding for mechanised harvesting as is the insertion height of the first capsule. Sesame seeds come in many colours depending on the cultivar harvested. The most traded variety of sesame is off-white coloured. Other common colours are buff, tan, gold, brown, reddish, gray and black.

2. Materials and Methods

The present work deals with the phytochemical analysis, medicinal properties and nutritional value of sesame seeds.

2.1. Collection and Preparation of Dried Plant Material

The seeds were collected from Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India. The plant material was then dried under the shade. After the plant material had been dried, it was kept in a proper container until the time of the extraction.

2.2. Preparation of Ethanol Extracts

Fresh weight 50g of sesame seeds were taken & subjected to drying. Dry powder of seeds was extracted into solvent like alcohol. Filtrate of these extract were used for further analysis

2.3. Phytochemical Screening of Plant extracts

The seeds were extracted into solvent like alcohol. The aqueous extract was freshly prepared & taken into different test tube. The phytochemical screening of given samples following tests were carried out for analysis.

2.3.1. Detection of alkaloids

Extracts were dissolved individually in dilute hydrochloric acid & filtered

2.3.1.1. Mayer's test

Filtrates were treated with Mayer's reagent (potassium mercuric iodide). Formation of yellow coloured precipitate indicates the presence of alkaloids

2.3.1.2. Wagner's test

Filtrates were treated with Wagner's reagent (Iodine in potassium Iodide). Formation of brown / reddish precipitate indicates the presence of alkaloids.

2.3.1.3. Dragendroff's test

Filtrates were treated with Dragendroff's reagent (solution of potassium Bismuth Iodide). Formation of red precipitate indicates the presence of alkaloids.

2.3.1.4. Hagers test

Filtrates were treated with hagers reagent (saturated picric acid solution). Presence of alkaloids confirmed by the formation of yellow coloured precipitate

2.3.2. Detection of saponins

2.3.2.1. Froth Test

Extracts were diluted with distilled water to 20 ml and this was shaken in a graduated cylinder for 15 minutes.

Formation of 1cm layer of foam indicates the presence of saponins.

2.3.3. Detection of flavonoids

2.3.3.1. Alkaline reagent test

Extracts were treated with few drops of sodium hydroxide solution formation of intense yellow colour, which becomes colourless on addition of dilute acid, indicates the presence of Flavonoids.

2.3.4. Test for steroids

5 drops of concentrated H₂SO₄ were added to 1ml of leaf extract development of red colouration was indicative of a positive reaction for steroids.

2.3.5. Test for terpenoids

2ml of leaf extract treated with 2ml of chloroform and few drops of concentrated H₂SO₄ occurrence of light orange colouration indicates presence of terpenoids.

2.3.6. Test for glycosides

Extracts was treated with 2ml of Glacial acetic acid, add 1drop of FeCl₃ and 1ml of concentrated H₂SO₄ appearance of brown colouration indicates the glycosides.

2.3.7. Test for quinone

Extracts was treated with concentrated HCL appearance of green colouration indicates presence of quinine.

2.3.8. Test for triterpens

To 0.5 g each of the extract was added 2ml of chloroform concentrated H₂SO₄ [3ml] was carefully added to form a layer. A reddish brown colouration of the interface indicates the presence of terpenoids.

2.3.9. Test for tannins

2ml of leaf extracts with 1% of lead acetate solution occurrence of yellowish precipitate shows presence of tannin.

2.4. Determination of Nutritional Composition of Seed Cake and Feeds

The nutritional composition of *Sesamum indicum* seeds were analyzed for moisture content, crude protein, crude fat, ash content and crude fiber according to method described by AOAC (1995). Carbohydrate content was calculated by difference. Mineral analysis was also done according to AOAC (1995).

3. Results and Discussion

Sesame seeds are a rich source of curative properties which render them usable in traditional medicines. there are, prevents diabetes, cures anemia cardiovascular health, anti-cancer properties, digestive health, relief from rheumatoid arthritis, respiratory health, protection from radiation damage, bone health, oral health, treatment of anxiety, lowers cholesterol, eye health, healing properties and skin detoxifier. The phytochemical screenings are listed in table 1.

The phytochemical screening carried out on *Sesamum indicum* seeds reveal the presence of Steroids, terpenoids, quinon and triterpens were not detected. The presence of some of these secondary metabolites suggests that the plant might be of medicinal importance and supports the bases for some

of the ethno uses. For instance, the presence of alkaloids, Flavonoids, glycosides, saponin and tannins suggest that the plant might have an antioxidant, anti-allergic, anti-inflammatory, anti- microbial, anti-cancer activity (Sheela *et al.*, 2015; Kunle and Egharevba, 2009). It also suggests that the plant might have diuretic properties (Jayvir *et al.*, 2002). The presence of tannins shows that the plant is astringent as documented and suggests that it might have antiviral and anti-bacterial activities and can aid in wound healing and burns (Haslem, 1989; Jayakumar *et al.*, 2013). Some researchers have also reported that some saponins have anti-cancer and immunomodulatory properties (Evan, 2002).

Table 1. Phytochemical screening of sesame seeds (*Sesamum indicum*)

Sl/No	Name of the Phytochemicals	Name of the Test	Alcoholic Extract
1	Saponin	Froth test	+
2	Alkaloids	Mayer's test	+
		Wagner's test	+
		Dragendroff's test	+
		Hager's test	+
4	Flavonoids	Alkaline reagent test	+
5	Tannins		+
6	Glycosides		+
7	Test for Steroids		-
8	Test for Terpenoids		-
9	Test for Quinon		-
	Test for Triterpens		-

The seeds are also very valuable sources of dietary protein with fine quality amino acids that are essential for growth, especially in children. The seeds are incredibly rich sources of many essential minerals. Calcium, iron, manganese, zinc, magnesium, selenium, and copper are especially concentrated in sesame seeds. Many of these minerals have a vital role in bone mineralization, red blood cell production, enzyme synthesis, hormone production, as well as regulation of cardiac and skeletal muscle activities. The physio chemical and mineral composition of sesame seeds and cashew nut was proposed by Alyemini *et al.*, 2011 and Aremu *et al.*, 2006 (table 2).

Table 2. Nutritional Value of sesame seeds (*Sesamum indicum*)

	Carbohydrates	23.45 g
	Protein	17.73 g
	Total Fat	49.67 g
	Dietary Fiber	11.8 g
	Carbohydrates	23.45 g
	Copper	4.082 mg
	Iron	14.55 mg
	Magnesium	351 mg
	Manganese	2.460 mg
	Phosphorus	629 mg
	Selenium	34.4 µg
	Zinc	7.75 mg
	Copper	4.082 mg
	Iron	14.55 mg

4. Conclusion

The phytochemical studies on the alcoholic extract of *Sesamum indicum* have revealed the presence of saponin, alkaloids, flavonoids and others such as glycosides and tannins. Therefore above analysis has revealed that, the plants are very rich in phytochemicals. As they possess these chemical principles they are effective against several disease parameters. Sesame seeds have been widely employed in culinary as well as traditional medicines for their nutritive, preventive and curative medicinal properties. Sesame is an important source of phytochemicals and nutrients contents.

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