



Therapeutic Properties of Edible Seeds: A Review

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Abstract

Seeds are high in fiber, healthy fats, proteins, and minerals like calcium, magnesium, potassium, iron, and zinc and additionally, they comprise vitamins B1, B2, B3, and E. Pumpkin, flax, sesame, sunflower, mustard, amaranth, oat, quinoa seeds are among the many edible seeds that are often included in human diet. Essential bioactive components which include alkaloids, carotenoids, flavonoids, glycosides, saponins, terpenoids, tannins, steroids, and polyphenolic compounds have been identified in the seeds; these constituents possess outstanding anti-inflammatory, antioxidant, anticancer, anti-diabetic, anti-hyperlipidemic, anti-obesity, and anti-neurological, cardiovascular, skin, and chronic disease properties.

Seeds are abundant in unsaturated fatty acids, proteins, dietary fiber, antioxidants, vitamins E, B6, folic acid, and niacin yet low in saturated fats and cholesterol. Minerals including magnesium, zinc, iron, copper, selenium, phosphorus, and potassium can be found in seeds.

The development of the body's immune systems is greatly aided by vitamins E, D, and B6, minerals like zinc and selenium, and amino acids like glutamine. This review explores the dietary benefits, therapeutic potential, pharmacological traits, and biologically active components of certain fruit seeds which are analyzed for their functions and applications as sources of food value and bioactive phytochemical constituents.

Keywords: Health, Nutrition, Seeds, Therapeutic, Diseases & Antioxidants.

Introduction

The immune system ought to be on high alert all the time, looking out for threats or indications of invasion. Immune system cells need to be able to differentiate between self and non-self, as well as between damaging non-self-molecules from infections and non-self-molecules from food (Caroline et al, 2019). These days, customers demand wholesome, useful foods (such fruits, vegetables, nuts, and seeds) as part of their diet in order to maintain an equitable way of life. The reason for this is the rise in the prevalence of a number of non-communicable diseases (NCDs), including diabetes, metabolic syndrome, cancer, cognitive decline, high blood pressure, and cardiovascular disease (CVD), all of which can be avoided or treated with dietary modifications (Chang et al., 2019).

Plant seeds are fully developed ovules that are high in nutrients, including healthy fats, proteins, fiber, and minerals like calcium, magnesium, potassium, iron, and zinc. Additionally, seeds include vitamins B1, B2, B3, and E. The antioxidant content of oily seeds keeps fats from going rancid. The seeds of pumpkins, opium poppy plants, flax, sesame, sunflower, mustard, amaranth, barley, oats, quinoa, nigella, and millet are among the often-consumed seeds. With their high content of iron, zinc, fiber, protein, and vitamins, seeds are a healthy replacement for meat, fish, and eggs. For optimal iron absorption, seeds should be consumed in conjunction with foods high in vitamin C, such as citrus juices, tomatoes, and capsicums.

The majority of edible seeds aid in controlling body weight, lowering the risk of diabetes, and heart disease. Flax seeds, for example, are rich in fiber and Omega 3 fatty acids, which help to build energy and strengthen immunity. The proteins in our bodies that improve immunity are increased by turmeric, which contains curcumin. Zinc-rich pumpkin seeds aid in the growth and operation of the body's white blood cells, which fight infection. High in protein oilseed meals prepared from peanut, soybean, rapeseed, and flaxseed can be used to make nutrient-rich diets when coupled with other ingredients such as cereal grains. (Sarwar et al., 2011a).

Oilseeds have been linked to lower levels of insulin and glucose, a low glycemic index, and increased satiety due to their high fat, protein, and fiber content and low levels of digestible carbohydrates (Kim et al, 2017). In addition to low amounts of iron and zinc, hemp seed oil can provide an adequate quantity of antioxidants, carotenoids, phytosterols, and phospholipids. It can also give a variety of minerals, including calcium, magnesium, sulfur, potassium, and phosphorus. A wealth of minerals that are good for your health can be found in mustard seeds.

Health Benefits of Seeds

Pumpkin seeds: The seeds are round, dark green, and some have a yellow-white husk covering them. They have a pleasant, slightly nutty flavor, are soft and flexible, and have a chewy texture. The high zinc concentration of seeds makes them beneficial to prostate health. It aids in blood pressure regulation and guards against heart attacks, strokes, and abrupt cardiac arrest. Fertility and the immune system are strengthened by seeds. Sterols associated with defense against hormone-based malignancies are also present in them. By reducing oxidative stress through insulin modulation, pumpkin seeds may aid in the prevention of diabetes complications. Tryptophan, an amino acid found in abundance in pumpkin seeds, is crucial for the synthesis of serotonin, a neurotransmitter that plays a vital role in mood regulation.

Having a handful of roasted pumpkin seeds can help prevent depression and maintain a positive attitude. Pumpkin seeds and a small piece of fruit, eaten a few hours before bed, are particularly helpful for melatonin and serotonin production, which helps to support a good night's sleep. Pumpkin Seeds (*Cucurbita pepo* L.), which include tocopherols, fatty acids, and phytosterols, have been researched for their potential to heal wounds. The outcomes showed outstanding wound healing activity. (Barda et al., 2016).

Sunflower seeds: These seeds contain a wealth of nutrients. It has been demonstrated that the mono and polyunsaturated fatty acids in sunflower seeds offer substantial health benefits, especially when it comes to heart health and the risk of cardiovascular disease. Among the

vitamins and minerals found in the seeds are vitamin E, which has strong anti-inflammatory properties and a low risk of heart disease; folate for DNA synthesis; phosphorus for bone health development; selenium, an antioxidant that protects against cell damage; manganese for bone production; copper for coronary health and defense against infection; B6 for cognitive development and function; and zinc for metabolism and defense mechanisms.

Mustard seeds: Mustard seeds come in a variety of colors and belong to the Brassica family, which also contains cruciferous vegetables. There is a sufficient amount of protein in mustard seeds. They are a great source of numerous minerals that are good for you. Particularly abundant in these seeds are minerals including calcium, manganese, copper, iron, zinc, and selenium. Teeth and bone development are aided by calcium. The body uses manganese to support the antioxidant enzyme superoxide dismutase. The synthesis of red blood cells requires copper. Red blood cell production and cellular metabolism depend on iron.

It is customary to utilize mustard seeds and oil to treat arthritic, rheumatic, and muscular discomfort. It is said that applying mustard oil to the scalp will promote hair growth. Ground seeds have laxative, stomach mucosa-stimulating, and intestinal secretion-inducing properties. (Sarwar et al., 2009).

Poppy seeds: Aside from being high in thiamine and folic acid, poppy seeds have 525 calories and are a good source of calcium, iron, magnesium, manganese, phosphorus, and zinc. 28% carbs, 42% fat, 21% protein, and 6% water are all included in the seeds. Not only do poppy seeds provide nutritious oil, but they are also a staple diet. Since alkaloids have analgesic qualities, this is their most essential application. Generally speaking, the main medicinal ingredient for treating conditions like diarrhoea, dysentery, pain, and spasms is refined opium, which is dried latex from plant capsules.

Sesame seeds: It is a staple in many cuisines from all over the world, including bread meals, soups, crackers, and meat dishes. Dietary fiber, protein, calcium, magnesium, manganese, copper, and vitamin B are all abundant in sesame seeds. They can prevent diabetes, cut the risk of cancer, shield DNA from radiation damage, reduce indications of aging, improve oral health, make digestion easier, and lessen the chance of cardiovascular disease, among many other health benefits.

Quinoa: China, Europe, North America, and Canada all have large production of quinoa, a cereal-based edible seed food source. The most popular usage for it is as a substitute for rice. It can also be processed into powder or flower flour and used to make chips, bread, halwa, and cereal flakes. Protein, fiber, folate, essential amino acids, vitamin B, thiamin, manganese, magnesium, phosphorus, and copper are all abundant in quinoa. Preventing gallstones, controlling digestion, safeguarding organ health, preserving blood sugar and cholesterol levels, and controlling weight are just a few of its many health advantages.

Flax seeds: These are the most nutrient-dense seeds; they are also known as linseeds. Owing to the presence of antioxidants such as lignans and omega-3 fatty acids, flaxseeds have a very significant effect in lowering blood cholesterol levels. Consequently, there is very little chance of contracting heat-related illnesses. In addition to lowering blood pressure, flaxseeds stop the body's malignant tumors from growing.

Therapeutic Properties of few important Seeds are presented in this article

Antioxidant and Anti-Inflammatory Activities: It is commonly known that oxidative stress plays a major role in the development of numerous illnesses, such as cancer, diabetes, obesity, and heart disease. Reactive oxygen species (ROS) are produced in cells in an unbalanced manner and are not sufficiently eliminated, which leads to oxidative stress. The antioxidant potential of mustard seeds (*Brassica nigra* and *Brassica alba*) was studied. The fatty acids erucic (6.87%), oleic (5.08%), and linoleic (1.87%) were found to be the main fatty acids in yellow mustard seeds, while oleic, linoleic, and linolenic acids were detected. (Mejia et al., 2015).

Fenugreek seeds contain linolenic and linoleic acids, they have strong anti-inflammatory and anti-arthritic properties. [Pundarikakshudu et al., 2016].

Hypoglycaemic Activity

Diabetes is one of the oldest illnesses in human history. In recent years, a variety of beneficial therapeutic approaches have been employed; nevertheless, many medication therapies include side effects that can jeopardize the health of patients. Fenugreek Seeds (*Trigonella foenum-graecum*) was used to measure fasting blood glucose and glycosylated hemoglobin (HbA1c) levels in patients with type 2 diabetes mellitus under diet management. Fenugreek seeds work in concert with diet, activity, fasting blood sugar, and HbA1c. [Ranade et al., 2017].

The seeds of the *Cuminum cyminum* plant, which belongs to the Apiaceae family and contains p-coumaric acid, ferulic acid, ellagic acid, and cinnamic acid, have been shown to have antioxidant, antidiabetic, and anticancer activities [Arun et al., 2016].

Anti-Cancer Activity: The extremely harmful side effects of medications used as chemotherapeutic agents are one of the primary issues with the current cancer treatments. Bioactive peptides have the potential to be anti-cancer drugs with little to no side effects because they exhibit cytotoxic action in several cancer cell lines. Peptides may function as cytotoxic agents via a variety of methods. The most common monoterpene hydrocarbon found in the methanolic extract of *Foeniculum vulgare* is l-limonene, a phenolic component. Other compounds found in the extract include sterols, alkaloids, phenols, and flavonoids. It was discovered that liver cancer and breast cancer cell lines had antioxidant, cytotoxic, and anticancer properties [Mohamad et al., 2011]. Effects of Mustard Seeds on Cancer Human non-small cell lung cancer cell lines A549 and H1299 were used to test the effects of an ethanolic extract of *Brassica nigra*. In a concentration-dependent way, *B. nigra* extract decreased the viability and clonogenic survival of A549 and H1299 cells, demonstrating a significant growth-inhibitory impact. *B. nigra* seed extract might have a significant anticancer effect on lung cancer in humans (Ahmed et al., 2020).

Conclusion

This paper highlights the intended use and phytochemical constitution of several kinds of seeds found in fruits and vegetables. The immune systems we have utilized to perform a wonderful task of protecting off foreign cells to keep us healthy. Antibodies are proteins that are synthesized by the human body to eradicate aberrant cells. There are foods that we can eat that

are essential to the effective functioning of our defenses against infection. The dietary requirements which are required for the growth and maintenance of immunity in the human body include zinc, selenium, and vitamins A, D, E, C, and B6.

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