

An Analysis of Several Properties of Peanut

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ABSTRACT: *Peanuts are a popular crop produced all over the globe. Apart from oil, peanut by-products include numerous additional useful components such as proteins, fibers, polyphenols, antioxidants, vitamins, and minerals that may be added as a functional ingredient to many processed meals. It was recently discovered that peanuts are high in substances including resveratrol, phenolic acids, flavonoids, and phytosterols, which help to prevent cholesterol absorption from the diet. It's also rich in Co-enzyme Q10 and includes all 20 amino acids, with arginine being the most abundant. These bioactive chemicals have been shown to have disease-fighting effects and are believed to help people live longer. The content of these beneficial chemicals has increased as a result of processing techniques such as roasting and boiling. The purpose of this article is to provide a review of peanut bioactive components and their health benefits.*

KEYWORDS: *Fiber, Flavonoid, Flour, Oil, Peanut.*

1. INTRODUCTION

Peanuts, sometimes called "groundnuts" in certain areas of the globe, are the edible seeds of a legume. India is the world's second-largest producer of peanuts, with a total output of 7.131 million metric tons per year. Peanut (*Arachis hypogaea*) is officially a pea and belongs to the bean/legume family (fabaceae). Despite being a legume, it is usually classified as an oilseed owing to its high oil content. Peanuts are a good source of protein, oil, and fiber. Peanuts are used to make peanut butter, confections, roasted peanuts, snack items, extenders in meat product formulations, soups, and desserts, in addition to oil [1].

There are hundreds of different types of peanut cultivars in the globe. Because of variations in taste, oil content, size, shape, and disease resistance, some cultivar groupings are favored for certain purposes. Different cultivars may be used interchangeably for various purposes, but the most common cultivars are Spanish, Runner, Virginia, and Valencia. The majority of peanuts indicated in the shell are Virginias, with a few Valencias chosen for their big size and beautiful shell look. Peanut candy, salted nuts, and peanut butter are the most common uses for Spanish peanuts. Peanut butter is made from the majority of Runner cultivars. China is the world's leading producer of peanuts, accounting for approximately 45 percent of total output, followed by India (16 percent) and the United States of America (5 percent) [2].

Peanuts are eaten in a number of ways all over the globe, the majority of which are traditional dishes. People on excursions to places like Antarctica, space, and hiking use peanuts as their only source of nutrition. In recent years, it has notably been the source of eradicating malnutrition among the people in several African nations [3].

1.1. History of peanuts:

Peanuts have a long history in Peru, dating back to the Inca Empire. They were the first to grow wild peanuts, which they gave to the sun God as part of their sacred rituals. Peanuts were

formerly referred to as ynhic. The Civil War in America in the 1860s marked the beginning of the modern history of peanut popularization. George Washington Carver is regarded as the "Father of the Peanut Industry" since he invented over 300 peanut-derived goods [4].

In the 1890s, a St. Louis physician invented peanut butter as a soft protein replacement for individuals with bad teeth. Dr. John Harvey Kellogg patented a "Process of making nut meal" in 1895, and the troops were fed peanuts. A method for roasting shelled peanuts in oil was invented in the early 1900s, according to John Mariana's "Encyclopedia of American food and drink," and packaged in sealed bags under the "Planters" name. Rosenfield J licensed his invention to the pond company, the makers of Peter Pan peanut butter, and began producing his own brand of peanut butter in 1928. This marked the beginning of the commercialization and popularization of peanut butter in the United States, which eventually spread to Europe and Asia [5].

1.2. Recent developments on peanut based products:

Peanut consumption varies greatly across the globe, thus commercial goods are also diverse and usually regional. Roasted peanuts, peanut butter, peanut oil, peanut paste, peanut sauce, peanut flour, peanut milk, peanut beverage, peanut treats (salted and sweet bars), and peanut cheese facsimile are just a few of the goods made from peanuts. Peanuts, raw or cooked, are eaten all throughout the globe. Peanuts are roasted by heating them to 180°C for 12–15 minutes or 160°C for 40–60 minutes, depending on their moisture level. Many studies have looked at the impact of adding peanut skin to peanut butter on antioxidant and total phenolic content. The fiber, phenolics, and antioxidant content of butter produced increased significantly.

Peanut oil is extracted using a variety of methods and is mostly consumed on the Asian subcontinent, particularly in India. The majority of peanut output is used for oil production throughout the globe. Peanut oil output increased from 4.53 million metric tons in 2000 to 4.91 million metric tons in 2010. Production is projected to account for almost 75 percent of the world's peanut oil, with China (44 percent), India (20 percent), and Nigeria (11 percent) being the biggest producers [6].

Peanut snacks (salted and unsalted) are primarily eaten in Asia, especially India. The peanut kernel is fried and coated in order to make them. Due to its emulsifying characteristics and as a composite flour, peanut flour is often made by grinding defatted peanut meal following oil extraction. It is also used in various dishes such as soup, pastries, and curries. It's also used to make meat coatings. Peanut flour may be used to make composite flours with non-wheat cereals or supplemented with protein-rich sources, such as legume flours, to enhance the nutritional content of bread, particularly in areas where wheat output is inadequate. Peanut bars are eaten in many ways all around the globe. They're made by coating partly crushed peanuts with sugar or jaggery after blanching and de-husking the kernels. It is often referred to as "chikki" in India [7].

Other peanut goods, such as peanut milk, fermented peanut products, cheese analogs, and peanut drinks, are still not well-known enough to be marketed. Peanut milk is created by crushing one volume of raw peanuts with six volumes of water for 30 minutes to generate

sludge. The pH is raised to 9.0, and the fat is separated from the starch and fiber using a cream separator. This method produces a yellow liquid that is virtually fat-free and rich in protein.

1.3. *Peanut as a functional food:*

Numerous chemicals found in peanuts and their skins have been shown to offer health advantages beyond simple nourishment. Peanuts are promoted as a functional meal with many functional components such as Coenzyme Q10, which protects the heart during periods of oxygen deprivation, such as high altitudes and blocked arteries. Peanuts are also high in dietary fiber and contain a variety of essential nutrients, including several B vitamins, vitamin E, minerals like iron, zinc, potassium, and magnesium, antioxidant minerals like selenium, manganese, and copper, and other antioxidant compounds like flavonoids and resveratrol. These bioactive components have been shown to have disease-fighting effects, with some acting as antioxidants and others promoting lifespan. The total biological substances in peanut seed, such as vitamin E in oil or chlorogenic acid, caffeic acid, coumaric acid, ferulic acid, flavonoids, and stilbene, contribute to the antioxidant capacity. The antioxidant and free radical scavenging properties of fermented peanut meal has been studied [8].

1.4. *Health benefits of peanuts:*

Because of their favorable lipid profile, which is richer in unsaturated fatty acids than saturated fatty acids, peanuts and processed peanuts have been proven to be good to health. Peanut oil is naturally devoid of trans fats, cholesterol, and saturated fats. It has a variety of beneficial biological benefits, most of which are linked to its high oleic acid concentration. Peanuts or peanut oil intake has been linked to a lower risk of cardiovascular disease (CVD) and has been shown to enhance blood lipid profiles, reduce LDL oxidation, and have a cardio-protective impact in many studies. Consumption of peanuts and their derivatives on a regular basis may lower the risk of colorectal cancer. Peanuts cause allergic responses in certain individuals [9].

Peanut intake has long-term health advantages in addition to everyday nourishment. Peanuts have a greater antioxidant content than well-known foods like green tea and red wine. Peanut skins are high in antioxidants and contain a lot of them. It has been shown that eating peanuts with their shells doubles their antioxidant capacity, and roasting may sometimes even enhance this capacity. According to recent study, cooking peanuts increases their antioxidant content. Boiling peanuts increases the amount of the isoflavone antioxidants biochanin A and genistein by two and four times, respectively [10].

When peanuts were added as a regular component of the diet, there was a 40% decrease in death owing to any cause. In those who eat peanuts or peanut butter on a daily basis, there is a lower risk of mortality from cardiovascular disease. Peanut intake has been shown to lower heart disease risk factors in people of all ages, both genders, and even individuals with multiple risk factors such as diabetes. High blood pressure is linked to an increased risk of heart attack and stroke. Scientists have discovered that the foods we eat have an effect on our blood pressure. Peanuts and peanut butter include beneficial monounsaturated fatty acids, plant proteins, magnesium, potassium, fiber arginine, and a variety of bioactive components, all of which may contribute to blood pressure reduction. Peanut consumption in modest quantities

on a daily basis was consistently linked to an increased risk of heart disease in population studies.

1.5. Cancer and peanuts:

Unsaturated fats, certain vitamins and minerals, and bioactive components, all of which are packed within a peanut kernel, have been proven to have cancer-preventive benefits. In particular, the phytosterols in peanuts that have been examined in relation to cancer have been found to decrease prostate tumor development by over 40% and cancer spreading to other regions of the body by almost 50%. Resveratrol, like phytosterols, has been proven to cut off the blood supply to cancer cells that are developing and to suppress cancer cell development.

1.6. Alzheimer's and gallstone disease:

Peanuts are rich in niacin and a good source of vitamin E, both of which have been proven to protect against Alzheimer's disease and cognitive loss as people age. Niacin from diet reduced the pace of cognitive deterioration in almost 4000 individuals aged 65 and above. It was also shown that although taking vitamin E pills had no impact on the occurrence of Alzheimer's disease, getting vitamin E through food did. The incidence of Alzheimer's disease was decreased by 70% in individuals who were in the top fifth of consumption. Resveratrol has also been shown to be helpful in the treatment of Alzheimer's disease and other neurological diseases. People who consume peanuts and peanut butter five times a week or more had a 25% lower risk of gallbladder disease, according to research.

1.7. Peanuts and weight management:

Numerous studies have shown that include peanuts and peanut butter in one's diet does not result in weight gain or an increase in body weight. In weight-loss studies, diets including peanuts, peanut butter, and peanut oil were shown to be more acceptable by participants of all ages and to offer long-term weight maintenance. In a separate study including just schoolchildren, it was discovered that the peanut-fed group lost weight while the control group gained weight over the course of two years. Many additional epidemiological research have shown that eating peanuts lowers total and LDL cholesterol.

1.8. Malnourishment:

Peanut milk, despite its unpopularity, is often used in emergency and malnutrition situations to help people recover quickly and regain their health. In the past, peanut-based products such as "Plimpy-nut," an RUTF (Ready-to-Use Therapeutic Food), were developed to combat acute malnutrition in African countries. It's a lipid-based combination with ground, roasted peanuts in it. Veggie oil, powdered milk, vitamins, minerals, and sugar are also included. Peanuts serve as the foundation for RUTF, allowing for improved delivery of a complete spectrum of balanced lipids, vital amino acids, minerals, and vitamins that growing infants need. Treatment with RUTF in children has repeatedly shown superior recovery rates and shorter time to reach weight-to-growth goals compared to standard World Health Organization (WHO) therapies for malnutrition rehabilitation in African countries like Malawi, Sudan, and Haiti. In 2003, Diop found that moderately malnourished RUTF-users had higher intake of energy, fat, iron, and

zinc than a control group. Both treatments caused little weight gain, although the RUTF group's impact persisted longer.

1.9. Issues related to peanut consumption:

1.9.1 Peanut allergies:

Albumins (water soluble) and globulins (water insoluble) are the two types of proteins found in peanuts (saline soluble). Globulins, which make approximately 87 percent of total protein, are the most common storage proteins. Arachin and conarachin are the two main proteins that make up globulins. A study looked at the allergenicity of various peanut kernels. Because the skins and hearts are typically removed during processing, the cotyledons (kernels) are most likely the main source of allergen for most people. This is due to saponins in the heart, which add a bitter taste, and catechol tannins and similar chemicals in the skin, which give final goods an unattractive hue.

The allergy's precise etiology is unclear. Since peanut allergies are linked to the release of histamine and other mediator chemicals from mast cells by immunoglobulin E (IgE) and other anaphylatoxins (degranulation). Histamine causes bronchospasm by causing vasodilation and the formation of bronchioles in the lungs, among other things. Vomiting, diarrhea, urticaria, angioedema (swelling of the lips, face, throat, and skin), aggravation of atopic eczema, asthma, and anaphylactic shock are some of the symptoms that may occur.

1.9.2 Peanuts and food poisoning:

The fungus species *Aspergillus flavus*, which may generate aflatoxin, is commonly found in peanuts. This illness may happen when peanut meals are being transported or stored. Flatoxins are extremely toxic and carcinogenic secondary metabolites that are a source of concern in the food industry. The presence of soil moisture stress during pod-filling, when soil temperatures are near optimum for *A. flavus*, may be linked to infection and aflatoxin content in peanuts. These relationships may be used to build a decision-support system that can forecast the likelihood of aflatoxin contamination in peanuts grown under comparable conditions.

A study was conducted to evaluate the contamination of locally produced peanuts with mycotoxin (aflatoxins). A total of 72 samples of raw, roasted, and salted peanuts were randomly gathered from Pakistan's Pothohar Plateau. According to the findings, aflatoxins were found in almost 82 percent of the samples examined, with levels ranging from 14.3 to 98.8 g/kg. This highlights the fact that ideal conditions for fungus development and mycotoxin contamination exist in both peanut production fields and storage facilities.

2. CONCLUSION

Peanuts are an excellent source of nutrition. They can be put to good use, especially in a country like India, which is one of the world's top peanut growers but, paradoxically, has the world's largest population of hungry people. Peanut sensitivities are virtually non-existent in India. Peanut is used in a variety of traditional cuisines in the nation as part of Mid-day meal plans, and on the basis of plump peanut, the undernourished may be fed and the double weight of ill health and corpulence can be reduced. Hence Organizational efforts and increased commercialization of peanut products may be used as a two-pronged approach to build a strong

population. Clearly, there is a massive expansion for the commercialization of peanut products, and market patterns seem to be very certain based on all of the previously stated reasons. Furthermore, there is a greater need for peanut buttering awareness that peanut may prevent unwanted supplementations via non-dietary sources on regular use in Indians, especially in rural areas.

3. CONCLUSION

Peanuts are a high-calorie, high-nutrient food. They may be used extensively, particularly in a nation like India, which is one of the world's top peanut growers but also has one of the world's worst rates of malnutrition. Peanut allergies are less common in India than they are in the United States. Peanut is utilized in many traditional recipes in the nation, and via Mid-day meal and plump nut programs, the undernourished may be fed, reducing the twin burden of hunger and obesity. As a result, organizational efforts and increased commercialization of peanut products may be combined to create a healthier population. Because of all of the aforementioned reasons, it is obvious that there is a lot of room for peanut goods to be commercialized, and market trends seem to be quite favourable. Also, there is a larger need to raise knowledge about how peanuts may help Indians avoid unwanted supplementations from non-dietary sources when consumed on a regular basis.

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