

TANNIN

TANNIN IS THE SUBSTANCE THAT GIVES A ROUGH FEELING IN OUR MOUTH WHEN WE EAT UNRIPE FRUITS. TANNIN IS BIOLOGICALLY PRESENT IN PLANTS TO PROTECT THEM FROM PESTS AND KEEPS PESTS AWAY FROM THE PLANT WITH THE BITTER AND GASSY TASTE IT CREATES.





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Tannins are a type of chemical compound that belongs to a larger group of compounds called polyphenols.

Their molecules are typically much larger than those found in other types of polyphenols, and they possess a unique ability to easily combine with other molecules, such as proteins and minerals.

Tannins are naturally found in a variety of edible and inedible plants, including tree bark, leaves, spices, nuts, seeds, fruits, and legumes. Plants produce them as a natural defense against pests. Tannins also contribute color and flavor to plant foods.

Some of the richest and most common dietary sources of tannins include tea, coffee, wine, and chocolate.

The astringent and bitter flavors that are characteristic of these foods and beverages are usually attributable to their abundant supply of tannins.







Benefits of tannins:

Prevent aging:

Tannins are molecules that are beneficial to human health due to their antioxidant properties. They help the body by protecting the tissues against the action of free radicals and prevent aging.

Anticancer:

They have also been shown to have anti-cancer properties. Under certain conditions, they are able to inhibit the growth of cancer cells. In different studies, they have been investigated as protective factors in the urinary system, cardiovascular system, and immune system.







Strengthen the skin:

Tannins are used in cosmetics for skin care and to prevent aging and fight hair loss, while other medicinal uses use them to maximize sexual performance.

Calming and anti-stress:

Tannins are also often touted as anxiolytics, as animal studies show they can decrease energy metabolism and protein digestion.





Application of tannins in various industry:

Currently, hydrocarbon-based raw materials are exploited in different petrochemical industries ranging from fuel to cosmetology. It leads to the widespread deficiency of raw material eventually that creates high inflations, environmental degradation, and adverse effects on human and animal health. This necessitates to explore new alternative natural biopolymers such as polylactic acid, chitosan, lignin, and tannins for replacing with currently used hydrocarbon based polymers. Tannins can be the best natural raw material for emerging and traditional industries. This is attributed to tannin's unique natural properties, chemical structure, and commercial properties. Tannins provide several advantages like being as good biomaterial, antimicrobial, antioxidant, pharmaceutical, biopesticide, and nutraceutical agent. Tannins can be tapped for their applications in food, wood, leather, pharma, and other industries as possible raw material.







Food industry:

Tannins are the secondary metabolites present in a substantial amount in plant-based food products. Due to their positive effects on the food as antibacterial and antioxidants, they are the major constituent of foods. Tannins are used as food preservatives, packaging materials, and food enhancements which owe to their protective nature.







Wood industry:

Wood is the inseparable part of the furniture and several important industries. Wood contains organic acids, tannins, and lignocellulosic material which are most susceptible to biological, chemical, and physical decaying agents. Therefore, wood requires a large number of synthetic adhesives, glues, antitermite chemicals, and other coating materials in order to protect it. However, these materials have tremendously benefitted the wood industry, but they adversely affect the environment conditions. Because synthetic phenolics, amino resins, and formaldehyde used in wood industries are generally carcinogenic in nature. To overcome this problem, scientists are investigating natural materials of herbal or animal origins, such as tannins, that can be the best option or alternative material to be used in the wood industries





Medicine and pharmaceuticals:

After the industrial revolution, large numbers of synthetic chemicals were used as drug molecules to treat numerous diseases but they left several adverse effects on the human and environment. Therefore, attention has been shifted to identify new alternative natural compounds that are to be clinically effective and create minimum adverse effects. A large number of natural compounds such as polyphenolic-based secondary metabolites, for example, tannins, are isolated and characterized as preventive therapeutic agents, which can be isolated from fruits, vegetables, or plants or expressed in the microorganism by metabolic engineering. Many studies have clearly shown that tannins are natural antioxidants linked with the prevention of degenerative diseases such as atherosclerosis, cardiovascular diseases, neurodegenerative diseases, and certain types of cancers by acting as antioxidants and antibacterial.







Role of tannins in animal husbandry:

Bacterial and fungal infection is also a threat to the poultry, livestock, and animal husbandry which is responsible for high level of mortality. To overcome this problem, several antibiotics have been used for decades that proved to be very effective; consequently, it improves animal and poultry production in the world. But it is well known that extreme application of antibiotics promotes the antibiotic-resistant among the microorganisms in cattle. Therefore, in-feed antibiotics and plant-based antibacterial agents, such as phytogenic compounds, have been discovered and promoted, which have great promises in future. In recent past, great attention has been given to antibacterial activities of tannins and their effects as dietary source in animal.





















Extracting of Tannin in High Purity

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