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AN OVERVIEW ON TANNINS

Sakshi Minocha[1], Srishti Kumari[1], Akhilesh Tiwari[2], Anil Kumar Gupta[1], Sanyam Gandhi[3], Ajay Sharma[4]

[1]Faculty of Pharmaceutical Science, Jayoti Vidyapeeth Women's University, Jaipur, Rajasthan, India.

[2]Institute of Pharmacy, Vikram University, Ujjain, M.P., India

[3] Regulatory Executive GSK, Pharmaceuticals, Stockley Park, London, United Kingdom

[4]Research Assistant, Jan and Dan Duncan Neurological Research Institute, Baylor College of Medicine, Houston, Texas

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Short Review

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Corresponding Author:

Sakshi Minocha

B. Pharmacy, Faculty of Pharmaceutical Science, Jayoti Vidyapeeth Women's University, Jaipur, Rajasthan, India.

Email: Saksmin7@gmail.com

ABSTRACT

This review was investigated and identification structure, role of the tannins in plants structure. Tannins are a complex group of polyphenolic compounds found in a wide range of plant species commonly consumed by ruminants. They are conventionally classified into two major groups: - the hydrolysable and the condensed tannins. During growth and maturation period in plants some substances can be found in structure of them which they have essential role in plant fortune. These substances are called plants secondary metabolites. One of the most important of secondary metabolites is Tannins. A great deal of research with tannins has followed an approach that looks at biological relationships: taxonomy, phylogeny, biosynthesis, nutritional and physiological effects on herbivorous animals e.g. ruminants. Their antimicrobial properties seemed to be associated with the hydrolysis of ester linkage between gallic acid and polyols hydrolyzed after ripening of many edible fruits. Tannins in these fruits serve as a natural defense mechanism against microbial infections. The antimicrobial property of tannic acid can also be used in food processing to increase the shelf-life of certain foods, such as catfish fillets. Tannins have also been reported to exert other physiological effects, such as to accelerate blood clotting, reduce blood pressure, decrease the serum lipid level, produce liver necrosis, and modulate immunoresponses. The dosage and kind of tannins are critical to these effects. The aim of this review is to summarize and analyze the vast and sometimes conflicting literature on tannins and to provide as accurately as possible the needed information for assessment of the overall effects of tannins.

INTRODUCTION

Tannin is an astringent, bitter plant polyphenolic compound that binds to and precipitates proteins and various other organic compounds including amino acids and alkaloids.

The term tannin refers to the use of wood tannins from oak in tanning animal hides into leather; hence the words "tan" and "tanning" for the treatment of leather. However, the term "tannin" by extension is widely applied to any large polyphenolic compound containing sufficient hydroxyls and other suitable groups (such as carboxyls) to form strong complexes with various macromolecules. Tannins are phenolic compounds composed of a very diverse group of oligomers and polymers found in plants parts including the leaves, roots and fruits. They precipitate proteins and also complex with starch, cellulose, and minerals. Tannins have molecular weights ranging from 500 to over 3000.

Tannins are found as shapeless yellowish or light brown masses like powder, flakes or sponge. Tannins are found almost in all plants and in all climates all over the world. Lower plants such as algae, fungi and mosses do not contain much tannin. The percentage of tannins present in the plants, however, varies. Tannins are usually found in large quantities in the bark of trees where they act as a barrier for micro-organisms and protect the tree.

STRUCTURE AND CHEMICAL PROPERTIES:

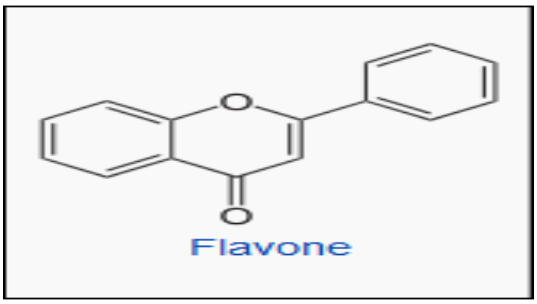

Figure 1:

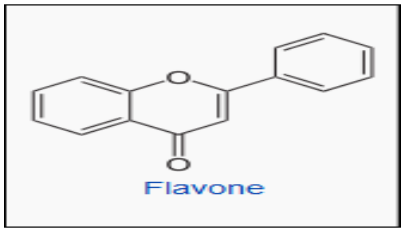

Figure 2:

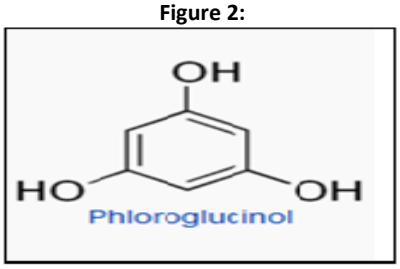

Figure 3:

Tannins have ability to precipitate the solutions of: Gelatin, Alkaloids, Glycoside, Heavy metals and Proteins.

Because of accumulation of OH group on small size nucleus they have anti-oxidant nature.

Tannins have property to react with mucous membrane and cause precipitation.

DEPENDING UPON CHEMICAL STRUCTURE TANNINS IS CLASSIFIED AS:

1. Hydrolysable tannin
2. Condensed tannin

HYDROLYSABLE TANNIN:

This is an ester of sugar and phenolic acidsor their derivatives; the sugar is usually glucose, but in some cases polysaccharides have been identified. Acidic, basic or enzymatic hydrolysis often occurs spontaneously during extraction or purification. At the center of a hydrolysable tannin molecule, there is a carbohydrate (usually D-glucose).This type or tannin is further subdivided into ellagitannin and gallotannin.

Examples of gallotannins are the gallic acid esters of glucose in tannic acid (C76H52O46), found in the leaves and bark of many plant species.

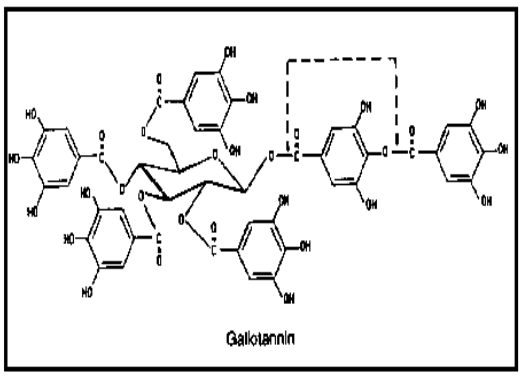

Figure 4:

CONDENSED TANNIN:

This tannin is certainly more important than hydrolysable tannin; much less is known about their structure and many aspects are yet to be elucidated .This type of tannin produces “tannin reds” while boiling with acid .Traditionally, most commercial sources of this type are heartwood of quebracho, bark of wattle. These have been used in leather process industries to get better types of quality leather.

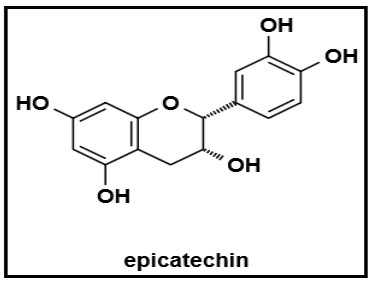

Figure 5:

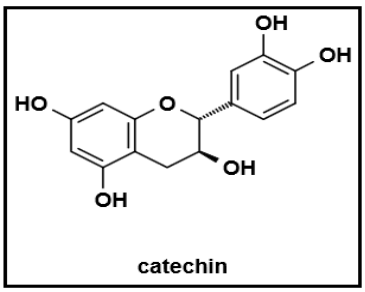

Figure 6:

APPLICATIONS:

1. Most of the Ayurveda, Siddha and Unani formulations contain many types of tannin as ingredients. Most of the ayurveda and siddha tooth powers contain tannin bearing materials to strengthen gums.

2. In leather industries, the art of tannin, i.e. converting animal hide or skin to leather is considered to be the first leather manufacturing process.

3. Tannin or tannic acid finds application in ink manufacture, dye industry, plastic resins, water purification, manufacture of adhesives, surface coatings, manufacture of gallic acid etc.

4. Tannins may be employed medicinally in antidiarrheal, haemostatic, and antihemorrhoidal compounds.

5. Tannins not only heal burns and stop bleeding, but they also stop infection while they continue to heal the wound internally. The ability of tannins to form a protective layer over the exposed tissue keeps the wound from being infected even more.

6. Tannins can cause regression of tumors that are already present in tissue, but if used excessively over time, they can cause tumors in healthy tissue.

7. Tannins when incubated with red grape juice and red wines with a high content of condensed tannins, the poliovirus, herpes simplex virus, and various enteric viruses are inactivated.

8. Tannins can also be effective in protecting the kidneys. Tannins have been used for immediate relief of

sore throats, diarrhea, dysentery, hemorrhaging, fatigue, skin ulcers.

CONCLUSION:

The nature and composition of tannin vary from plant to plant and species to species. A lot of research in this field is very much needed to explore the utility and nature of the various types of tannin.

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