Tannins

- Tannins are astringent, bitter-tasting naturally occurring **plant polyphenols**. Their main characteristic is that they **bind and precipitate proteins**.
- They act as a **defense mechanism** in plants against pathogens, herbivores and hostile environmental conditions. Generally, tannins induce a negative response when consumed.
- The term tannin (from the Celtic word for oak) refers to the source of tannins used to convert animal skin into leather
  - The term is applied to any large polyphenolic compound containing sufficient hydroxyls and other suitable groups (such as carboxyls) to form strong complexes with proteins and other macromolecules.
- Tannins have molecular weights ranging from 500 to over 20,000.
- They can have a large influence on the nutritive value of many foods eaten by humans and feedstuff eaten by animals.
- Tannins are common in fruits (grapes, persimmon, blueberry...), in tea, in chocolate, in legume forages (trefoil..), in legume trees (*Acacia* spp., *Sesbania* spp., ...), in grasses (sorghum, corn ...).
- Tannins contribute to many aspects of our daily lives.
  - They are responsible for the **astringent taste we experience when we partake of** wine or unripe fruits, and for the enchanting colors seen in flowers and in autumn leaves.
- Tannins are touted as excellent antioxidants.
- Many of them are glycosides.
- Best source is **nutgall**.
- These are colourless non-crystalline substances which form colloidal solutions in water.

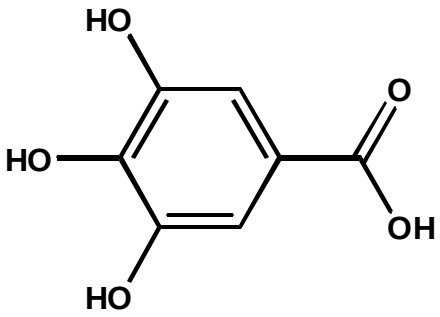
Classification

	Hydrolysable Tannins (the pyrogallol class)	Condensation Tannins (catechol) proanthocyanidins
Constituent	Esters of glucose with acids such as chebulic, ellagic. gallic and m-digallic	which are based on leuco-anthocyanidins and like substances joined together in a manner not clearly understood
Reaction towards aqueous solution of Iron salts	gives blue-black color (used to manufacture ink)	condensed tannins produce green-black colors
	being less astringent tan more slowly and produce leather of less solidity	

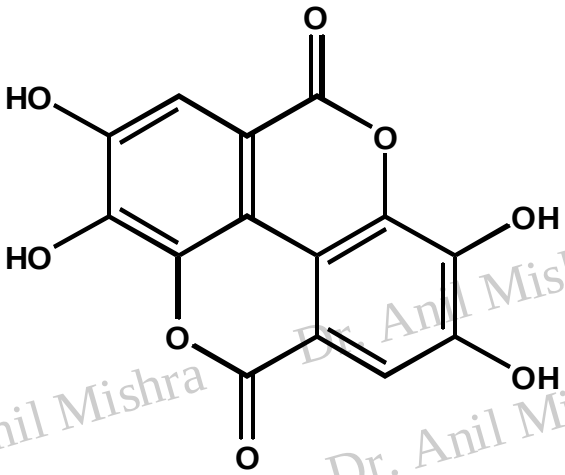
- *The terms "condensed" and "pyrogallol," as such do not mean that the tannins contain these substances but simply indicate that dihydric and trihydric phenols are produced respectively when the materials are heated*

Constituent of Tannins

- **Hydrolysable Tannin**

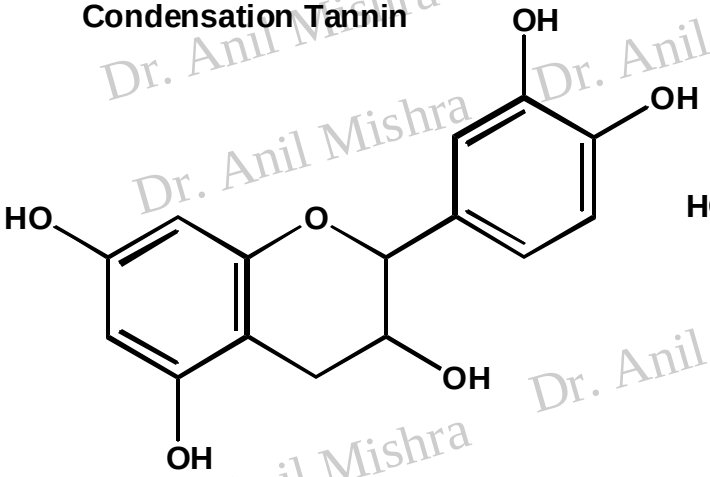


gallic acid

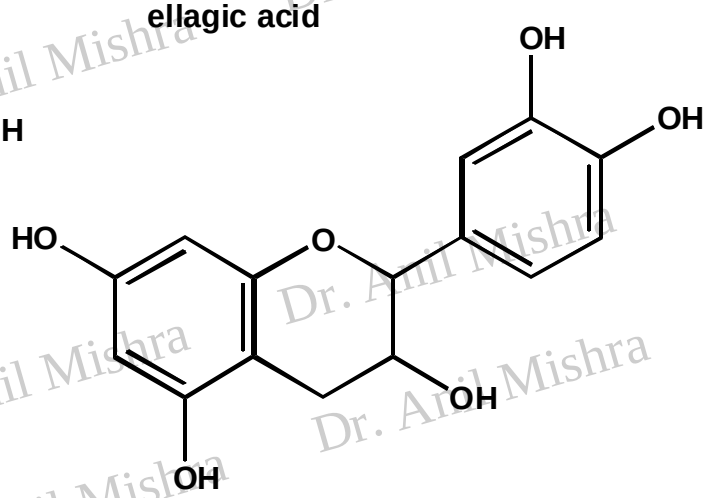


ellagic acid

Condensation Tannin



catechin



epicatechin

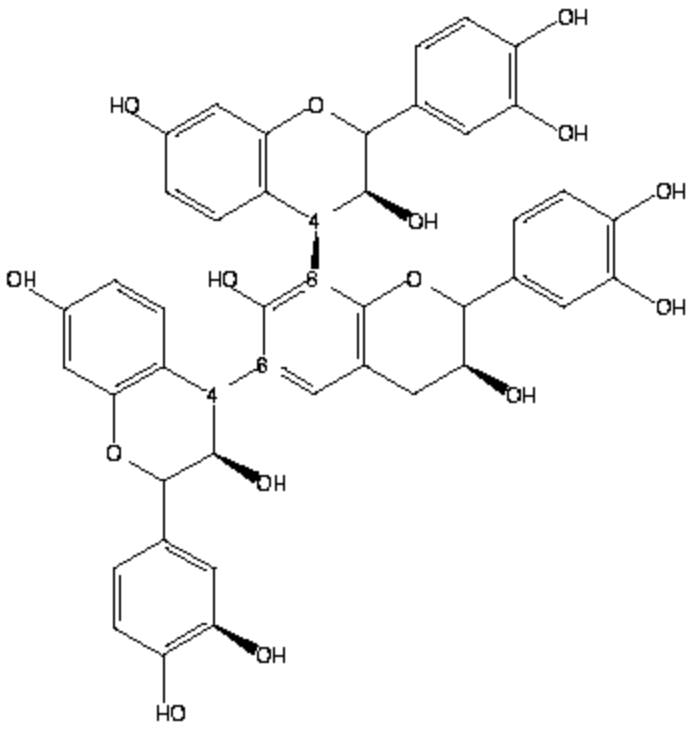
Herbs that have tannins as their main component are astringent in nature and most such medicinals are listed in the Materia Medica category of astringents. The most common applications are treating:

- Intestinal disorders, such as diarrhea and dysentery, intestinal parasites, rectal prolapse, hemorrhoids;
- Bleeding, including functional bleeding, hematochezia (blood in the stool), bleeding hemorrhoids, and topically for bleeding wounds and ulcerations; and
- Excessive discharge, such as enuresis and frequent urination; leucorrhea; hyperhidrosis (excessive sweating) and night sweating; involuntary seminal emission.

Medicinal uses of some Tannins

Herb (Botanical Name/Pinyin)	**Taste, Nature**	**Applications**
Acacia catechu gall (*ercha*) [catechu gall]	bitter, astringent, neutral	cough, red and white dysentery; topically for skin ulceration
Cedrela sinensis root bark (*chungenbaipi*) [Chinese cedar]	bitter, astringent, cool	red-white dysentery, hematochezia, morbid leucorrhea, functional bleeding, involuntary emission
Punica granatum rind (*shiliupi*) [pomegranate]	astringent, warm	chronic diarrhea and dysentery, hematochezia, rectal prolapse, involuntary emission, functional bleeding, morbid leucorrhea, intestinal parasites
Quercus acutissima fruit (*xiangshi*) [acorn]	astringent, mildly warm	diarrhea, rectal prolapse, hemorrhoidal bleeding
Quercus infectoria gall (*moshizi*) [oak gallnut]	bitter, warm	red-white dysentery, hyperhidrosis, oral ulceration, leucorrhea, hemorrhoids, rectal prolapse; topically for skin lesions
Rhus semialata gall (*wubeizi*) [sumac gallnut]	sour, salty, cold	cough, rectal prolapse, spontaneous sweating, night sweating, epistasis, functional bleeding; topically for wound bleeding, ulcerous dermatitis, toxic skin swelling
Rosa laevigata fruit (*jinyingzi*) [rosehips]	sour, astringent, neutral	enuresis, frequent urination, morbid leucorrhea, persistent diarrhea, involuntary emission
Terminalia chebula fruit (*hezi*) [chebulic myrobalan]	bitter, sour, neutral	chronic diarrhea and dysentery, rectal prolapse, aphonia due to longstanding cough, hematochezia, leucorrhea, night sweating, involuntary emission

Condensation Tannin



Hydrolysable Tannin

Ellagitannin