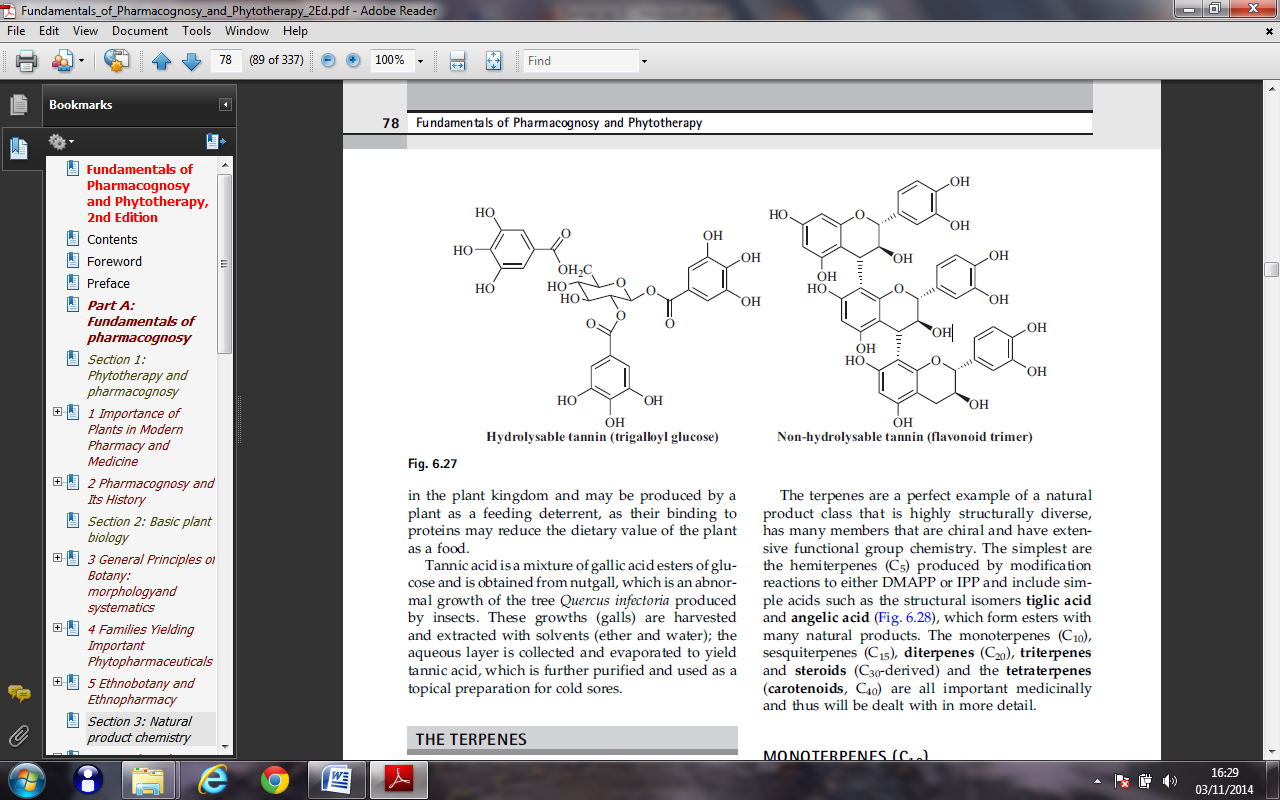
**Tannins**

A class of natural products that gives rise to the astringency and bitterness in plants and food are the tannins.

They are broadly divided into two groups: the hydrolysable tannins, which are formed by the esterification of sugars (e.g. glucose) with simple phenolic acids that are shikimate-derived (e.g. gallic acid), As their name suggests, the hydrolysable tannins may be hydrolysed with base to simple acids and sugars

The non-hydrolysable tannins, which are sometimes referred to as condensed tannins (does not contain sugar) that occur due to polymerization (condensation) reactions between flavonoids.



On treatment with acids or enzymes condensed tannin converted into red insoluble compounds known as phlobaphenes which gives the characteristic red colour to many drugs such as red cinchona bark, which contains these Phlobatannins and their decomposition products. On dry distillation they yield catechol and these tannins are therefore sometimes called catechol tannins. Like catechol itself, their solutions turn green with ferric chloride.

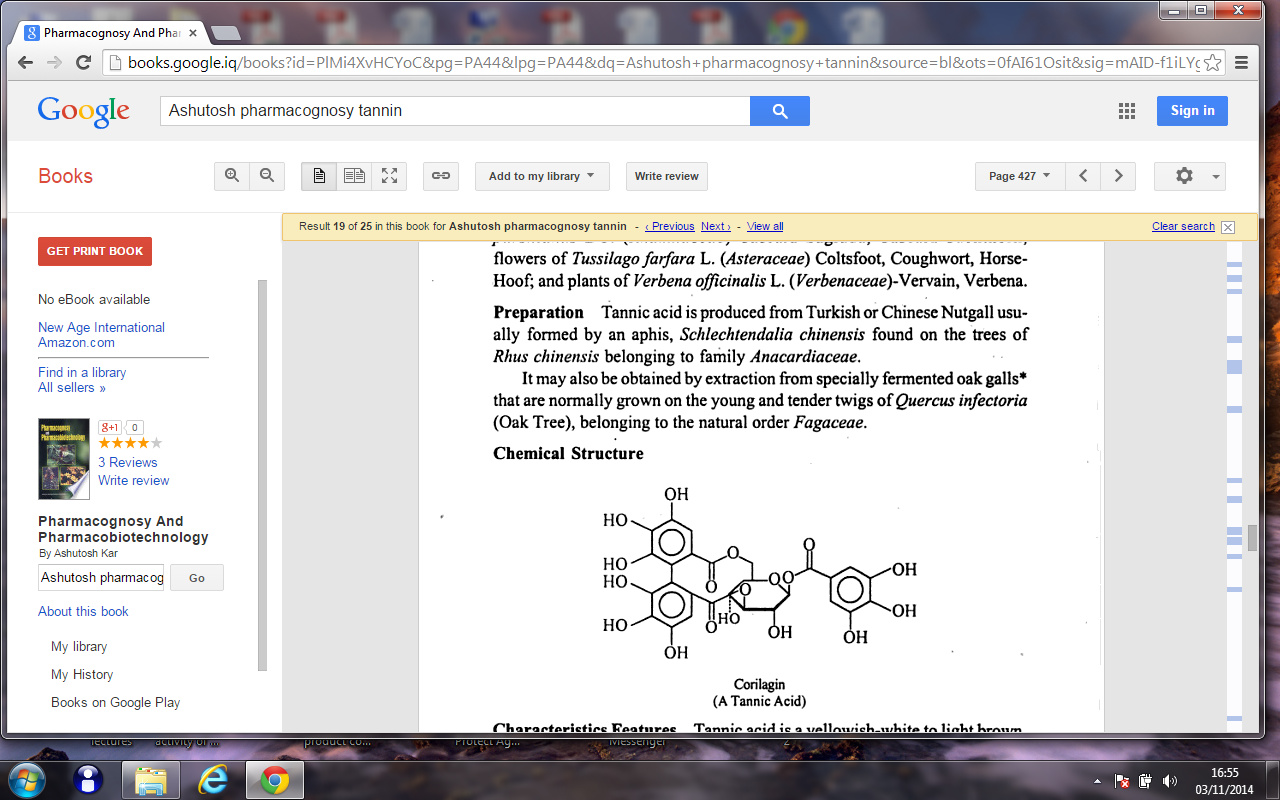
Example s on plants contain condense tannins are leaves of hamamelis and tea especially green tea.

**Uses of tannins**

A key feature of tannins is their ability to bind to proteins, and they have been used to tan leather, clarify beer and as astringent preparations in pharmacy as a gargle. The green and blue colour of their ferric chloride complex (reaction) renders them as a good source for the manufacture of ink. It is also use to treat alkaloids poisoning by formation of a precipitate which is difficult to absorb.

**Drugs containing tannins**

Tannic acid is a mixture of gallic acid esters of glucose and is obtained from nutgall by fermentation, which is an abnormal growth of the tree *Quercus* *infectoria* produced by insects. These growths (galls) are harvested and extracted with solvents (ether and water); the aqueous layer is collected and evaporated to yield tannic acid, which is further purified and used as a topical preparation for cold sores.



Tannic acid

Tannic acid when heated to 200-210 oC gives a compound called pyrogallol which gives a deep blue coloration with FeCl3.



**Ellagic acid**

Ellagic acid is a natural phenol antioxidant found in numerous fruits and vegetables. The antiproliferative and antioxidant properties of ellagic acid have prompted research into its potential health benefit.  Ellagic acid found in pomegranate rind and raspberry.

The **ellagitannins** are a diverse class of [hydrolyzable tannins](http://en.wikipedia.org/wiki/Hydrolyzable_tannin), a type of [polyphenol](http://en.wikipedia.org/wiki/Polyphenol) formed primarily from the oxidative linkage of [galloyl](http://en.wikipedia.org/wiki/Galloyl) groups in [1,2,3,4,6-pentagalloyl glucose](http://en.wikipedia.org/wiki/1,2,3,4,6-pentagalloyl_glucose). Ellagitannins differ from [gallotannins](http://en.wikipedia.org/wiki/Gallotannin), in that their [galloyl](http://en.wikipedia.org/wiki/Galloyl) groups are linked through C-C bonds (dimer) then intramolecular cylization between OH of each gallic acid unit with COOH of the other unit



Gallic acid Ellagic acid

Pomegranate (*Punica granatum)* contains [ellagitannins](http://en.wikipedia.org/wiki/Ellagitannin). A few [dietary supplements](http://en.wikipedia.org/wiki/Dietary_supplements) and nutritional ingredients are available that contain extracts of whole pomegranate and/or are standardized to punicalagins, the marker compound of pomegranate

