pharmacognosy

3rd stage/1stterm

Anthraquinone Glycosides

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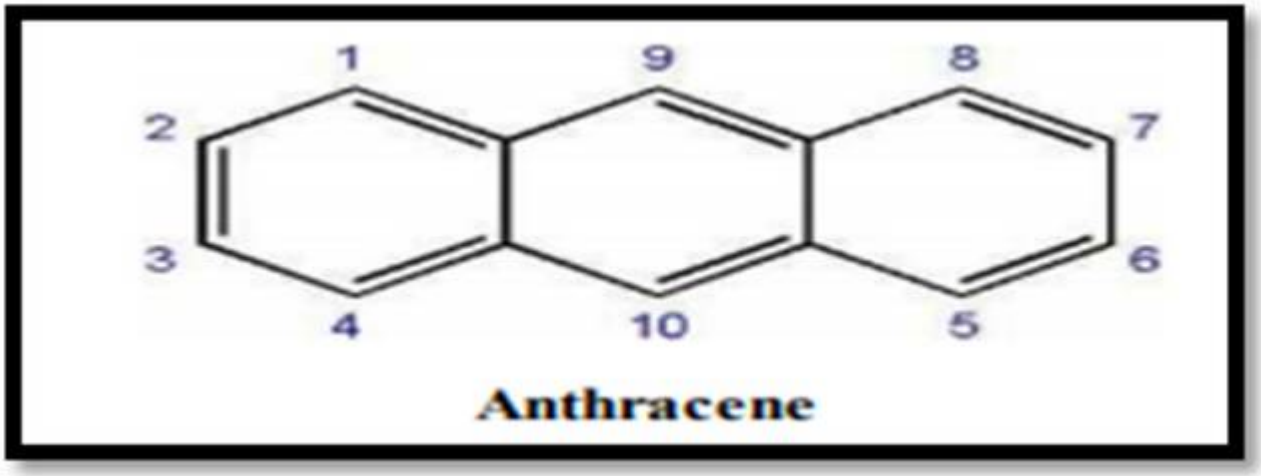
Lec .5

Anthraquinone Glycosides

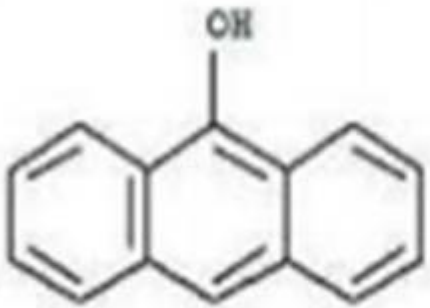
- These glycosides with aglycones related to **anthracene** are present in drugs such as cascara sagrada, frangula, aloe, rhubarb and senna.
- These drugs are used as cathartics.
- The glycosides upon **hydrolysis** yield aglycones that are di-, tri-, or tetrahydroxy anthraquinones or modifications of these compounds.



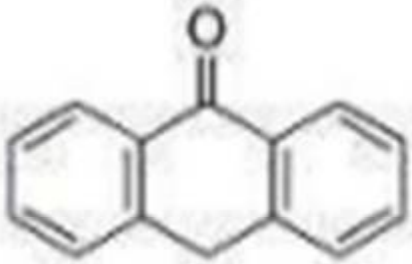
Anthracene

- Without sugar moiety, free anthraquinones exhibit little therapeutic activity.
- The sugar is essential **because it serves to transport the aglycone to the site of action in the large intestine**.

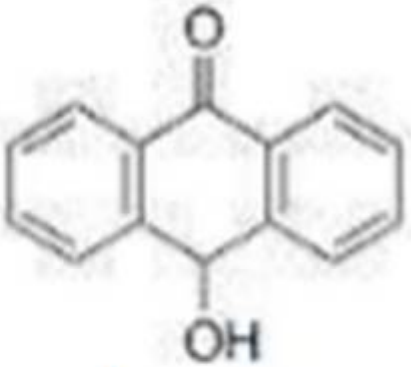
- The anthracene derivatives occur in these medicinal plant substances in various forms at different oxidation levels as derivatives of anthraquinone, **anthrone, or oxanthrone and of anthranol, as well as in a dimeric form (dianthrone)** in some cases.



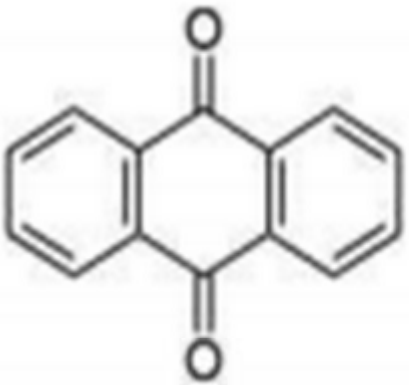
Anthranol



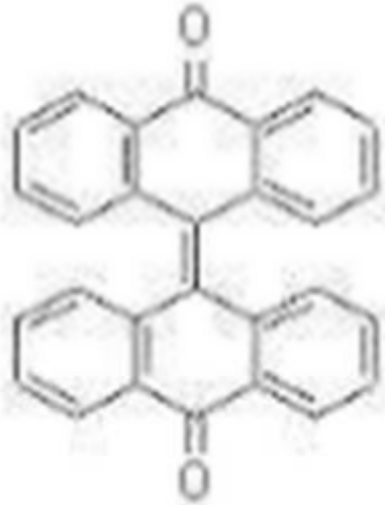
anthrone



oxanthrone

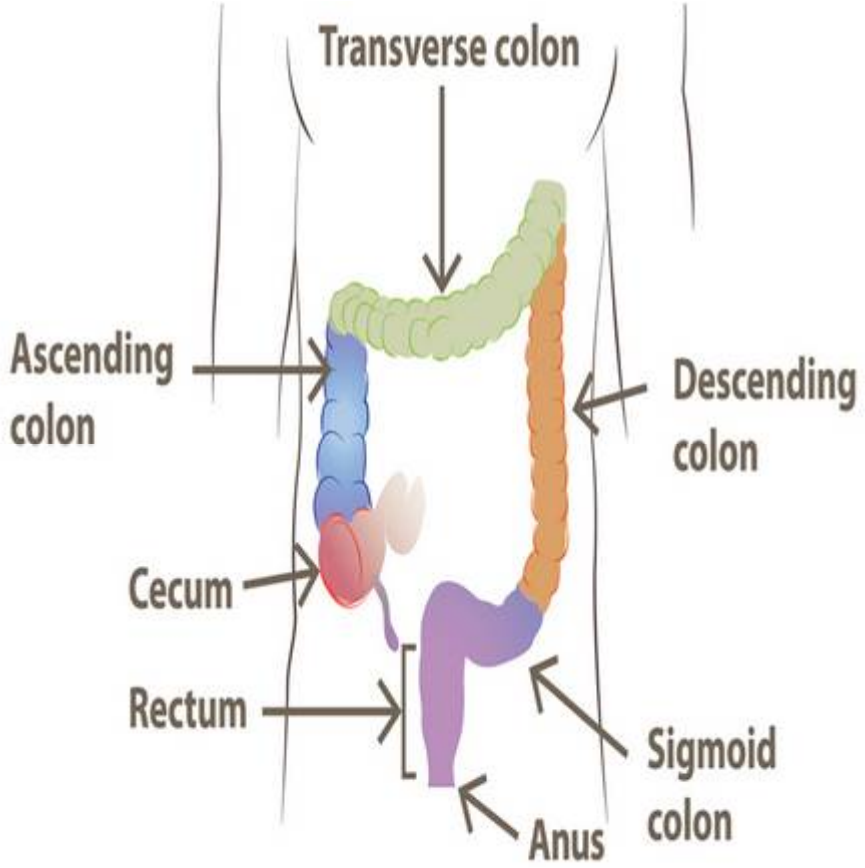


Anthraquinone



dianthrone

- The anthraquinone and related glycosides are stimulant **cathartics** and exert their action by **increasing the tone of the smooth muscle** in the wall of the colon and stimulate the **secretion of water and electrolytes ion to the large intestine.**



- The drugs of choice are cascara sagrada, frangula and senna.

- **Aloe and rhubarb** are not recommended because they are irritant.

cascara sagrada

Plants containing anthraquinone glycosides

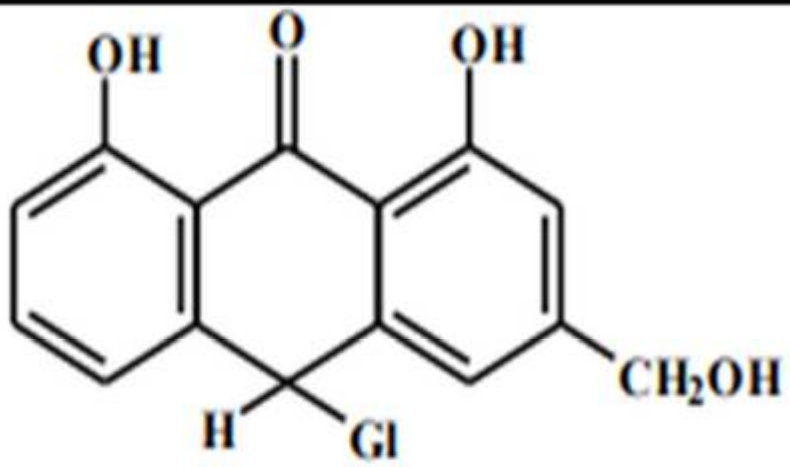
1. Cascara Sagrada

- Cascara sagrada or rhamnus purshiana is the **dried bark** of Rhamnus purshianus (F: Rhamnaceae).
- It should be aged for at least one year before use in medicinal preparations to lose its griping properties.

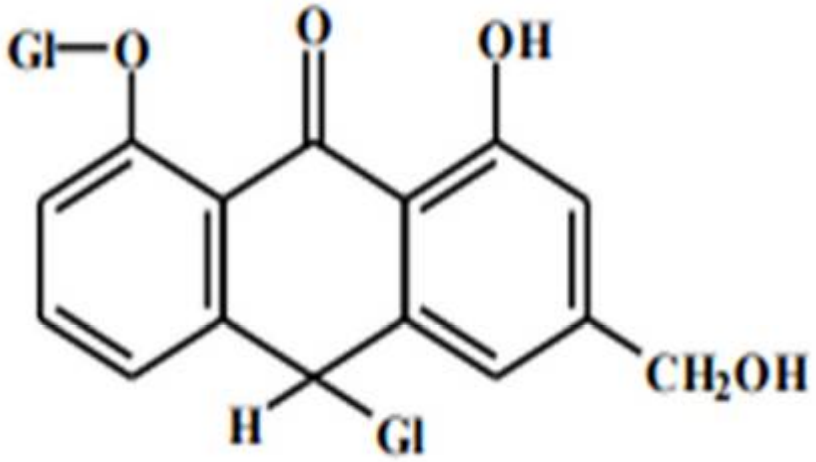
- Drugs containing reduced forms of anthraquinone glycosides should be stored for at **least one year** before use in order to change the **reduced** form which has **drastic griping** action into the corresponding **oxidized** form which has **less griping action**.

Active constituents:

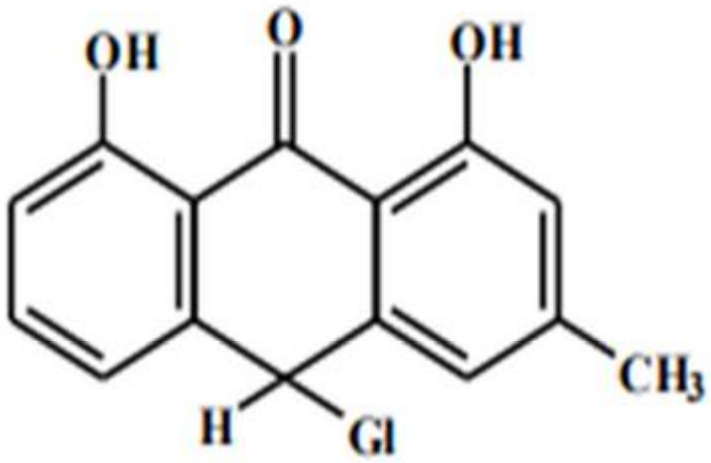
1. Cascarosides A&B (glycosides of barbaloin)
2. Cascarosides C&D (glycosides of chrysaloin which is deoxy barbaloin)



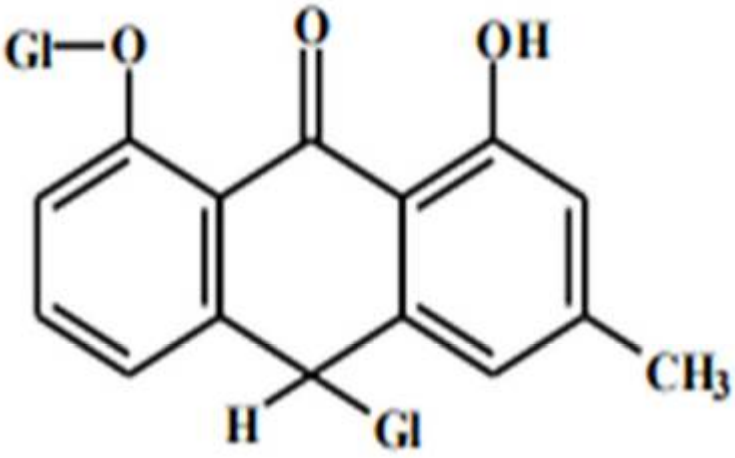
Barbaloin



Cascaroside A& B



Chrysaloin



Cascaroside C & D

- Cascara sagrada is **a cathartic**, its principal use is in the correction of habitual constipation, where it is not only acts as a laxative but **restore normal tone to the colon.**

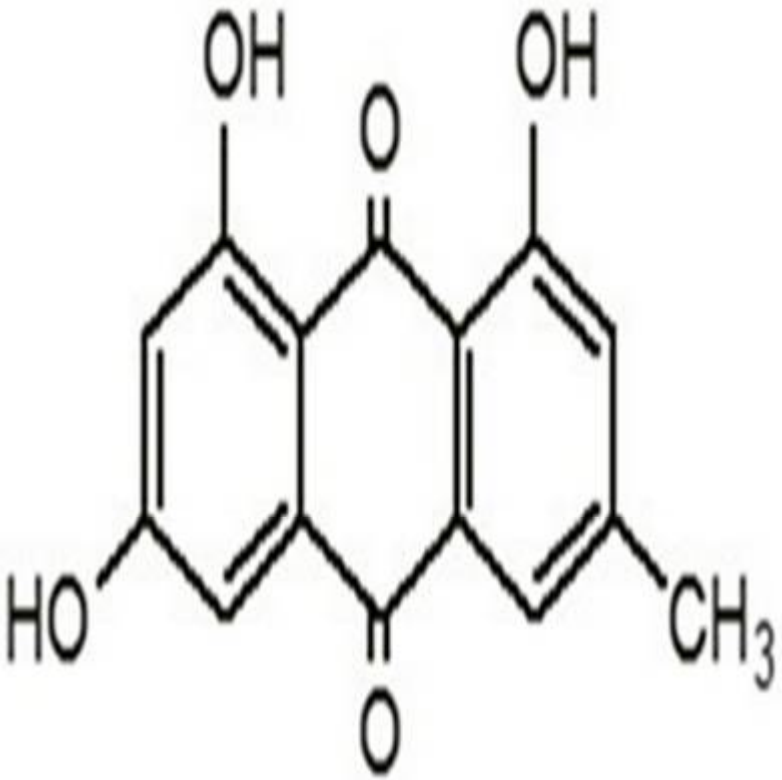
2. Frangula

- Frangula **bark** is the dried bark of **Rhamnus frangula**.
- Its **laxative** effect is due to the presence of anthraquinone glycosides.

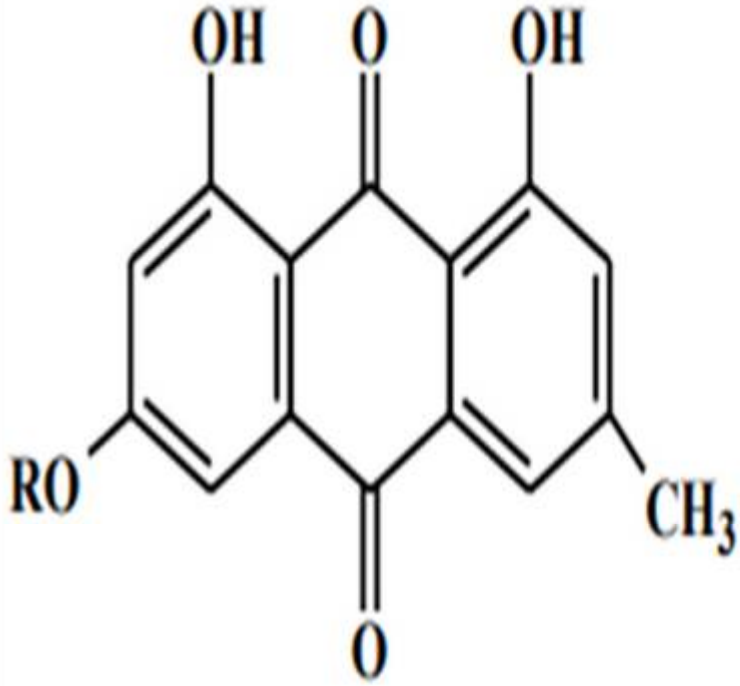
Active constituents:

1. **Frangulin** (frangula emodin rhamnoside).
2. **Glucofrangulin** (frangula emodin glucorhamnoside).

Again like cascara , the bark should be aged a year or more before its use for medicinal preparations.



Emodin



Frangulin R= Rhamnose

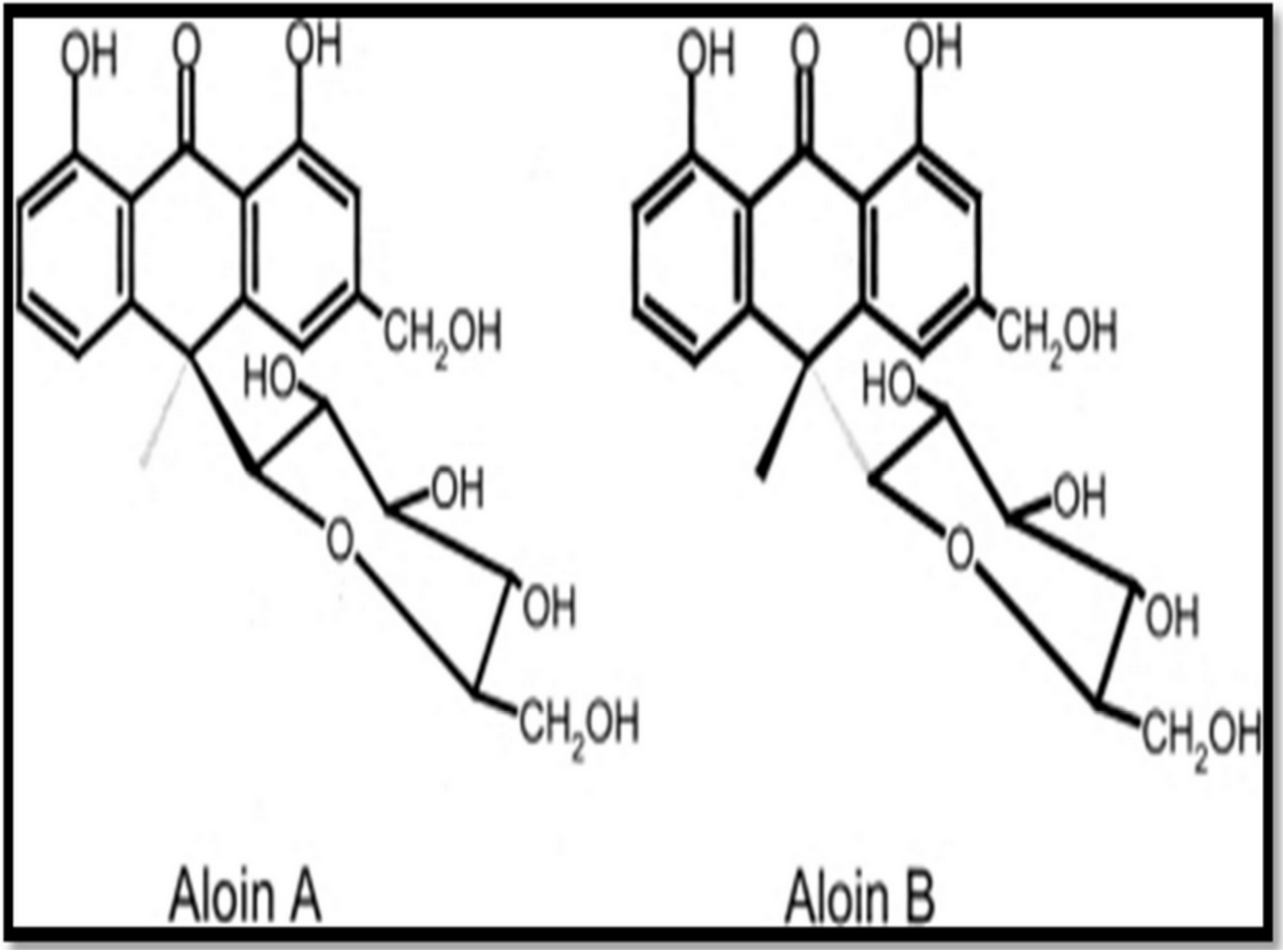
Glucofrangulin R= Rhamnose-glucose

3. Aloe

Aloe or aloes is the dried juice of the **leaves of Aloe barbadensis** (F: Liliaceae).

Active constituents

- Aloe contains a number of anthraquinone glycosides, the principal ones are **aloins A and B.**
- The active constituents of aloe vary qualitatively and quantitatively **according to the species from which the drug is obtained.**


OH
O
OH
CH2OH
HO
OH
O
OH
CH2OH
Aloin A
OH
O
OH
CH2OH
HO
OH
O
OH
CH2OH
Aloin B

Uses:

- As a cathartic by acting on the large intestine.
- The fresh juice has been used in the treatment of burns and other skin irritations.
- The extracted gel could be blended with a special lanolin base.
- The ointment is recommended for the treatment of sunburn, deep thermal burns and radiation burns.
- It can be used to relief pain, itching and tend to minimize keratosis and ulceration.

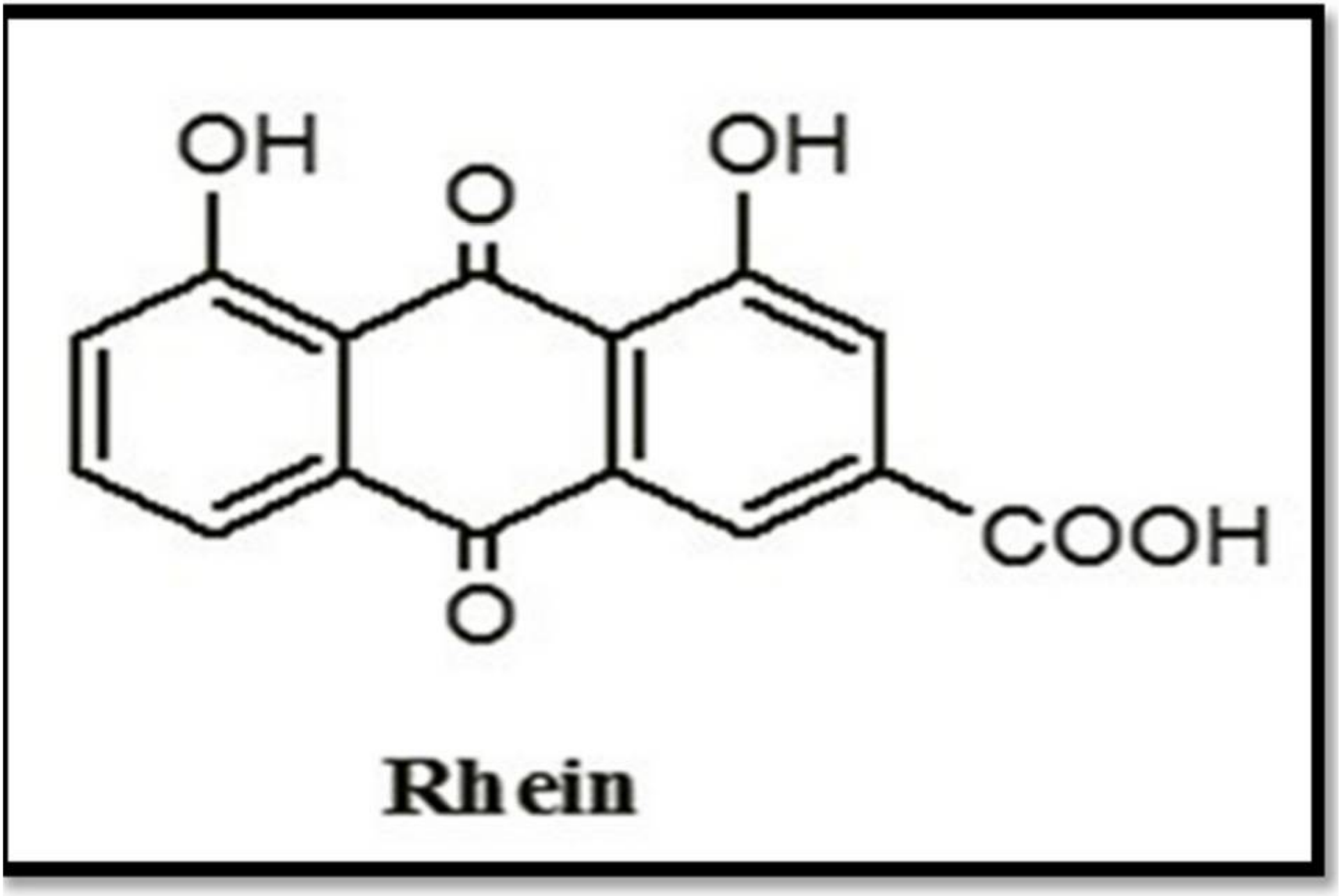
4. Rhubarb

Rhubarb, rheum or Chinese rhubarb consists of the dried **rhizome and root** of Rheum officinal (F: Polygonaceae).

Active constituents:

The principal constituents of medicinal rhubarbs are **rhein anthrones.**

Uses: Rhubarb has been used as **cathartics.**



Rhein

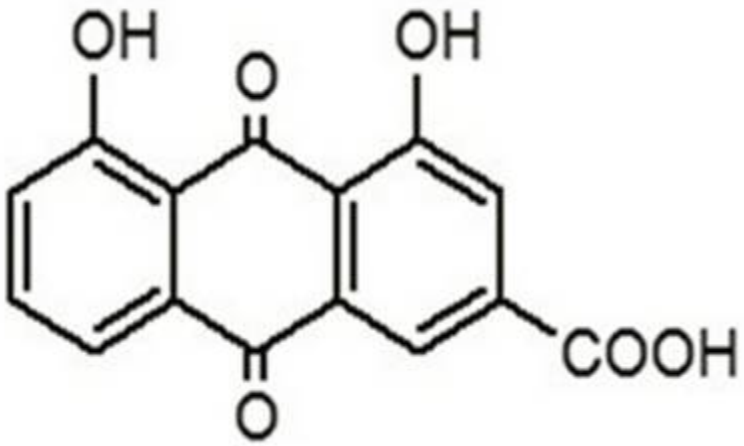
5. Senna

Senna or senna leaves consist of the **dried leaflets** of **Cassia acutifolia**, known in commerce as Alexandria senna (F: Fabaceae).

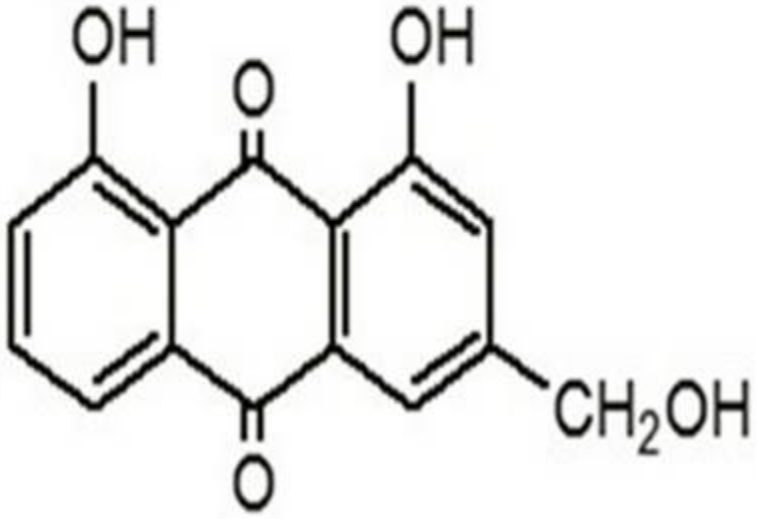
Active constituents:

- Senna are dimeric glycosides whose aglycons are composed of aloe-emodin and/or rhein.
- Thaose are sennosides A and sennosides B **(major constituents)** which are stereoisomers whose aglycones are rhein dianthrone while,
- sennosides C and D **(minor contents)** which composed of one molecule of rhein and one of aloe-emodin.

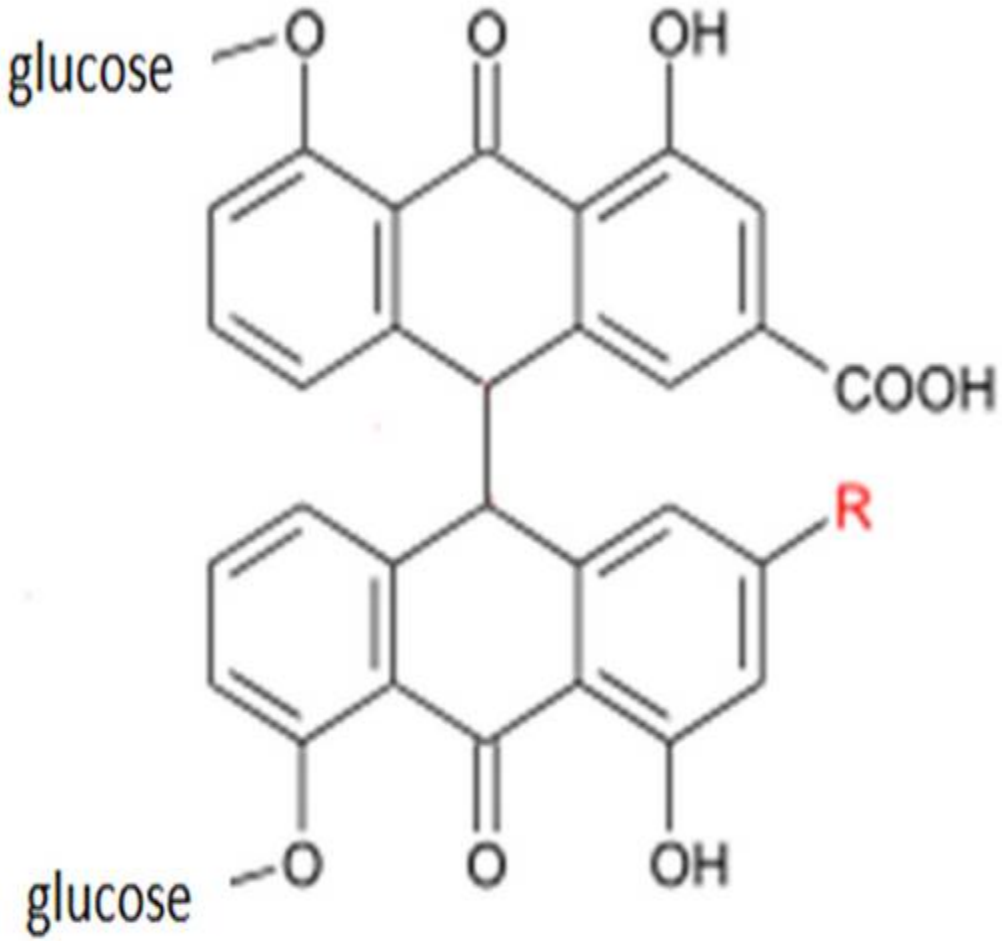
Uses: as cathartics.



Rhein



Aloe-emodin



Sennosides A and B (R: COOH)

Sennosides C and D (R: CH_2OH)

Thank You