

Indole alkaloids

Lab.4

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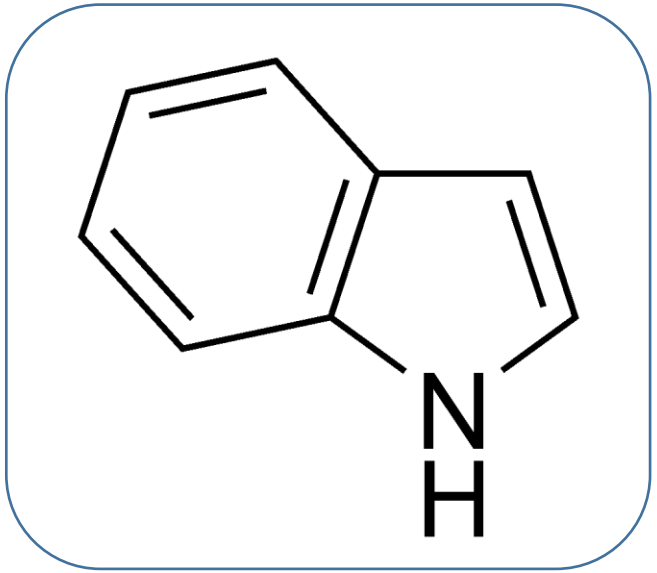
Indole Alkaloids



- Harmala Alkaloids
- Peganum harmala of the family Zygophyllaceae.
- Part used : seeds
- It is a woody, perennial, succulent shrub native to arid regions. The leaves are bright green, finely divided and about 1 cm long. Both the roots and seeds contain significant quantities of Beta-carbolines (indole) alkaloids, which are absent in the rest of the plant.

The Traditional and Medical Uses:

- The traditional uses including as ***the dye "turkey red",*** and as ***incense*** from ancient times.
- Peganum harmala was thought to be an important medical plant. Its seeds were known to possess hypothermic and essentially hallucinogenic properties since it is MAO inhibitor agent .



Medical Uses:

- Various studies on the antibacterial, anti fungal and antiviral effects of Peganum harmala seeds. In Moroccan traditional medicine , seed powder is sometimes used on skin and subcutaneous tumors.

- the anti neoplastic properties of Peganum harmala in that the active principle at a dose of 50 mg / kg given orally to mice for 40 days was found to have significant anti tumor activity

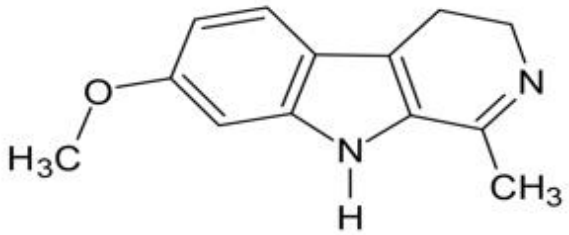
Medical Uses:

- Peganum harmala alkaloids thus posses significant anti tumor potential, which could prove useful as novel anticancer therapy.

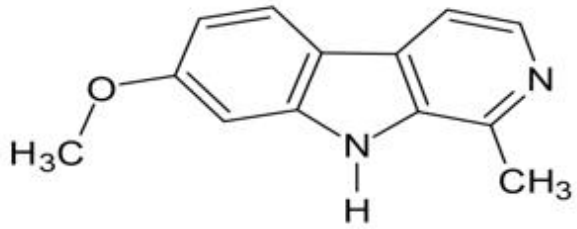
- The pharmacologically active compounds of Peganum harmala are several alkaloids ,which are found especially in the seeds (2-7% total) and the roots.

Constituents of Peganum harmala

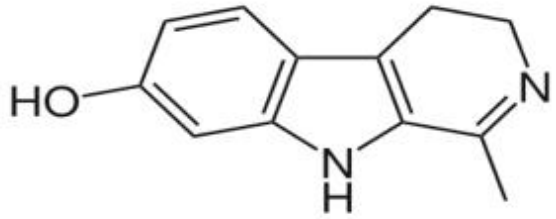
- beta-carbolines such as: harmine , harmaline and Harman.



Harmaline



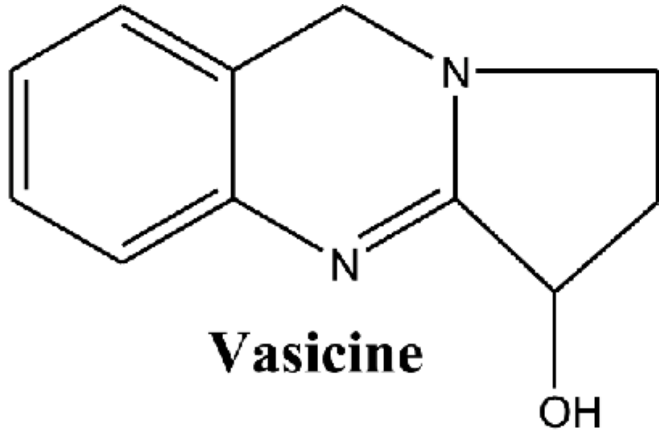
Harmaine



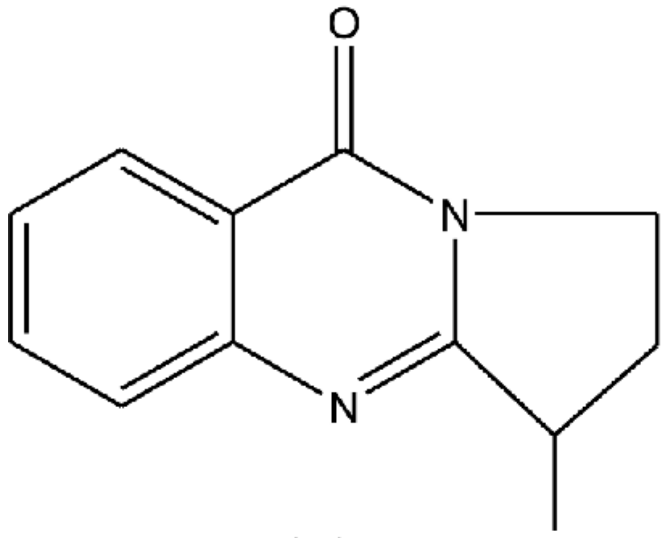
Harmalol

Constituents of Peganum harmala

- Peganum harmala also contains the quinazoline derivatives vasicine and vasicinone. It is believed that these quinazoline alkaloids are responsible for the abortifacient activity of Peganum harmala extracts. It has been reported that these chemicals have a uterine stimulatory effect, apparently through the release of prostaglandin. Peganum harmala alkaloids are characterized by the fluorescence property.



Vasicine



Vasicinone

Isolation of The Harmala Alkaloids by Extraction:

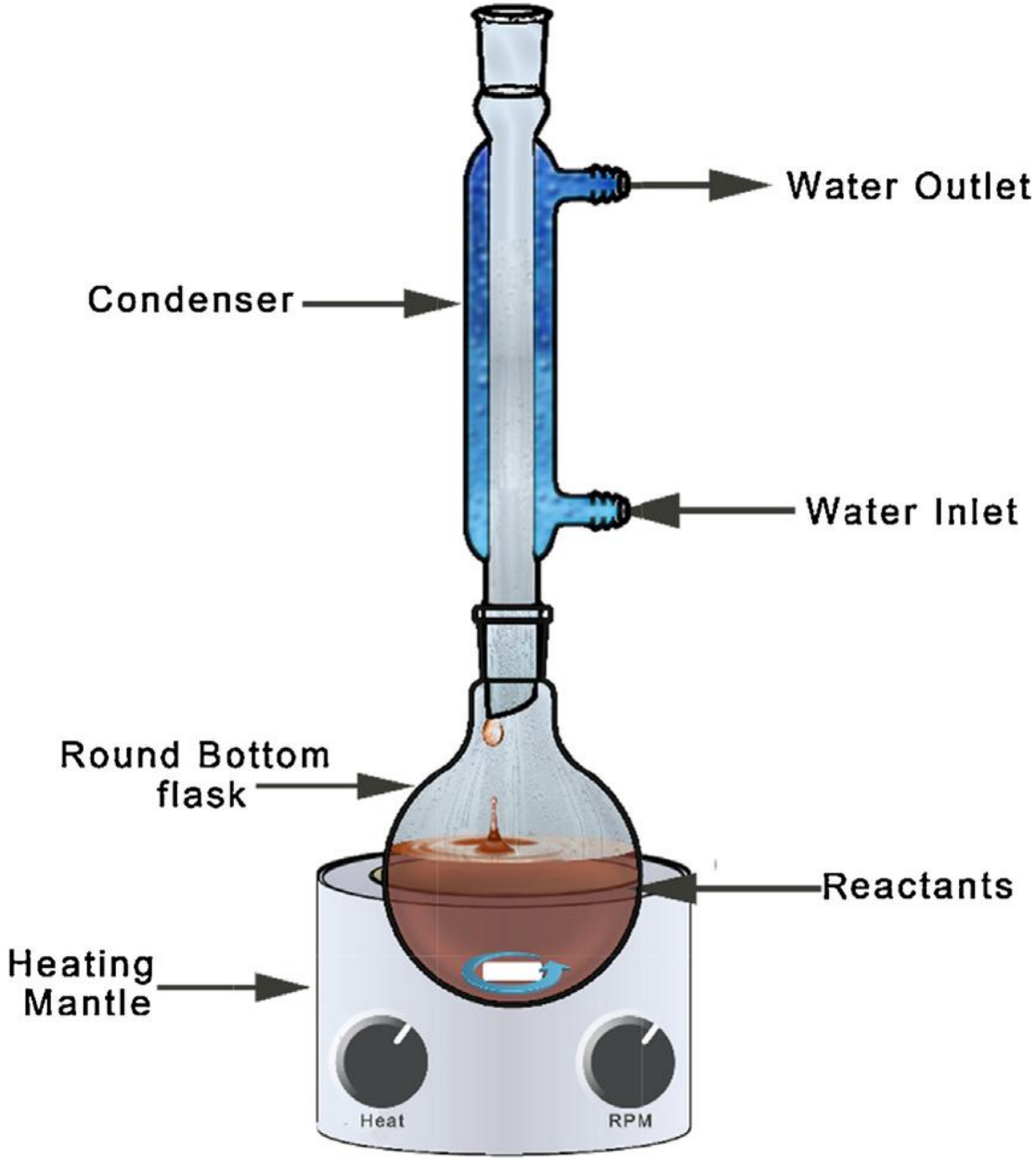
- Aim: isolation of the Harmala Alkaloids.
- Equipments:
- Large beaker.
- Small conical flask.
- Reflux apparatus.
- Separatory funnel.
- Water bath.
- Litmus paper.
- Funnel.
- Filter paper.

Isolation of The Harmala Alkaloids by Extraction:

- ***Reagents:***
- *Petroleum ether.*
- *90 % Ethanol.*
- *Ammonium hydroxide solution.*
- *2%HCl.*
- *Chloroform.*
- *Methanol.*

Procedure:

- Method of extraction: Reflux.
- Plant used: Peganum harmala
- Part used: Seeds



Procedure:

Maceration *50 gm* of the harmala seeds in *500 ml* of *petroleum ether* for 24 hrs (over night).

↓

Filter

↓

Reflux with 90% *ethanol* for 1 hr.

↓

Cool & Filter

↓

Take *20 ml* of Extract in conical flask

↓

Evaporate the filterate on water bath to about *2 ml*

↓

Add

↓

5ml of *2%* *HCl*

(Filter if necessary.)

Procedure:

Partition with ***Chloroform*** (***10 ml*** x 2), take the acidic layer (upper layer)

↓ Add

Ammonium hydroxide solution (check by litmus paper)

Place the basic solution in the separatory funnel

↓ Add

[***10 ml*** of ***Chloroform***] two times

↓ (Shake & stand)

Take the organic lower layer and put it in the conical flask

↓ Add

Small amount of ***Anhydrous sodium Sulphate*** & allow standing for few minutes until get a clear solution , decant and concentrate by evaporation to give the product crude alkaloids.