



**PHARMACOGNOSY III  
PRACTICAL, 3<sup>RD</sup> STAGE,  
2<sup>ND</sup> SEMESTER**

*Lab. 2*

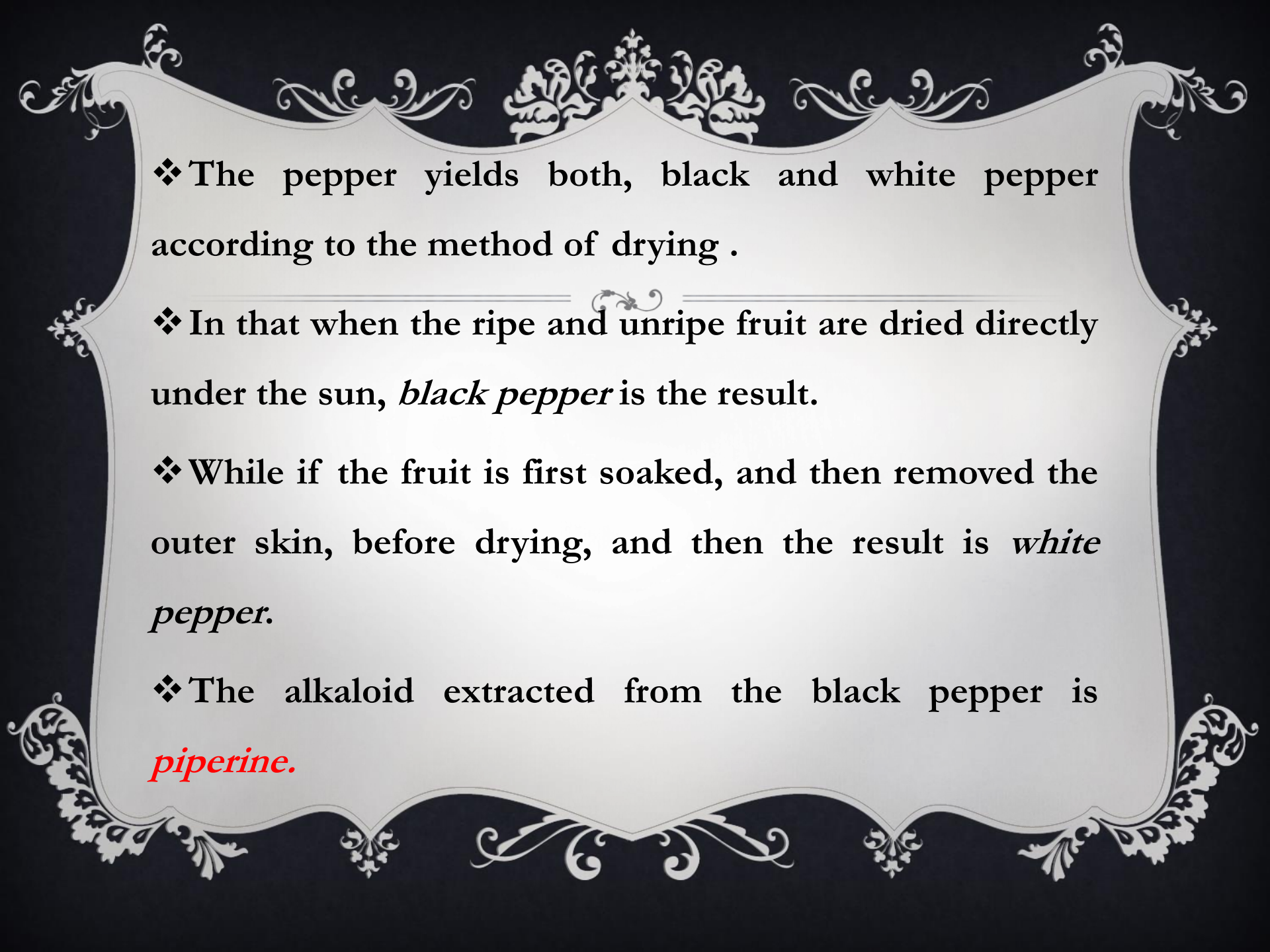
**م.د. شيرين محمد مكي الحسيني**

# BLACK PEPPER

- ❖ *The botanical name: Pipper nigrum of the family Piperaceae. It belongs to the *pyridine* and *piperidine* group of the typical alkaloid.*
- ❖ *This plant is a perennial plant producing berry -like and aromatic pungent fruits, that are green when unripe and become red at mature, then the dried berries become black and wrinkled producing *black pepper*.*



**Black pepper**



❖ The pepper yields both, black and white pepper according to the method of drying .

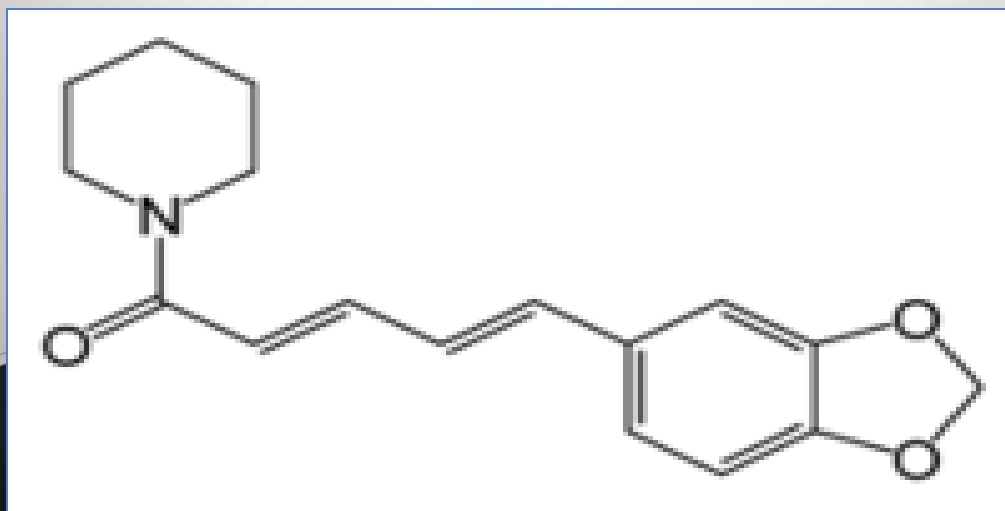
❖ In that when the ripe and unripe fruit are dried directly under the sun, *black pepper* is the result.

❖ While if the fruit is first soaked, and then removed the outer skin, before drying, and then the result is *white pepper*.

❖ The alkaloid extracted from the black pepper is *piperine*.

❖ Piperine alkaloid is a solid substance essentially insoluble in water. It is a weak base that is tasteless at first, but leaves a burning aftertaste.

❖ The molecular formula is  $C_{17}H_{19}NO_3$ , and the chemical structure of piperine is:



# THE PHARMACOLOGICAL ACTIVITY OF PIPERINE

- ❖ Piperine aid in the digestion of food due to its stimulation to the digestive enzymes.
- ❖ There is some evidence that it has an anticonvulsant activity in the treatment of epilepsy.
- ❖ There is some evidence that it has an anticancer and anti-inflammatory activity due to its antioxidant property.

## THE ISOLATION AND IDENTIFICATION OF PIPERINE FROM BLACK PEPPER:

### ❖ Extraction:

❖ Aim: to isolate the piperine alkaloid from black pepper. .

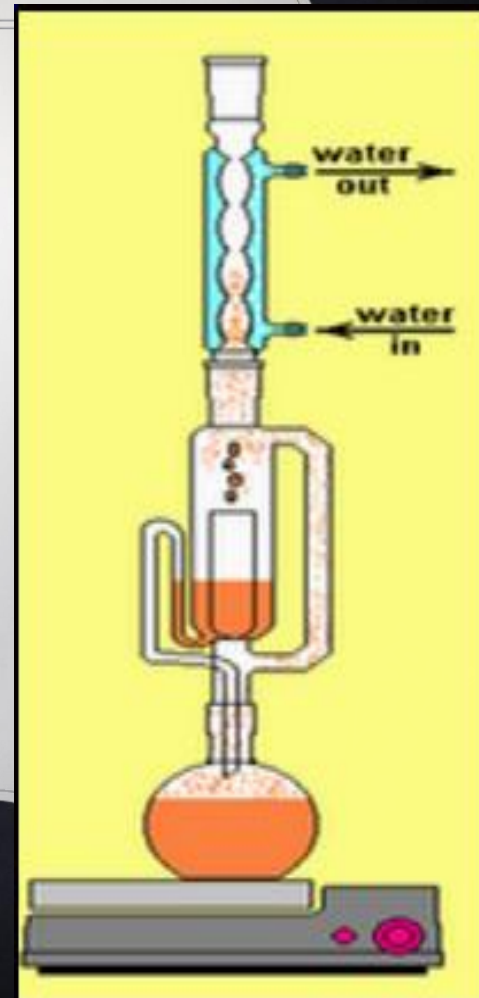
### ❖ Equipments:

❖ *Large beaker & medium size beakers.*

❖ *Soxhlet instrument.*

❖ *Funnel & filter paper.*

❖ *Water bath*



❖ **Reagents:**

90% ethanol, and 10% alcoholic potassium hydroxide.

❖ **Method of extraction:** Decoction.

❖ **Plant used:** *Piper nigrum*.

❖ **Part used:** Seeds.

# PROCEDURE

*10g* fine powdered of black pepper in *150 ml* of 90% ethanol for *2 hrs.* In Soxhlet extractor

↓  
Hot filtration

*30 ml* of extract solution concentrated on water bath at *60*<sup>0</sup>C

↓  
Add

*2 ml* of 10% Alcoholic KOH

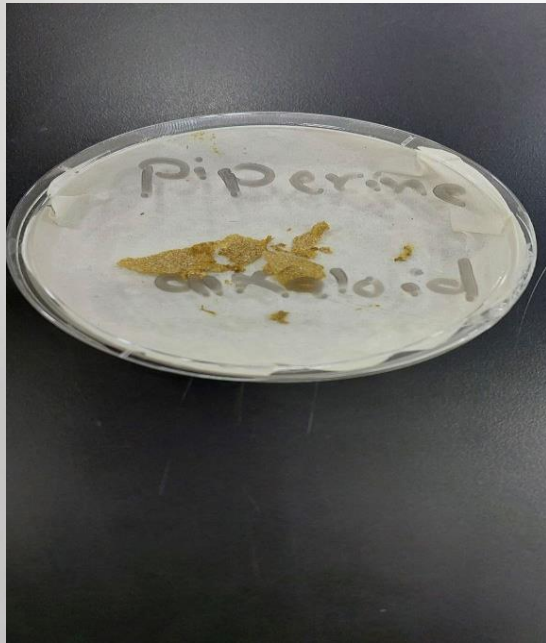
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Filtrate & alcoholic extract is left over night

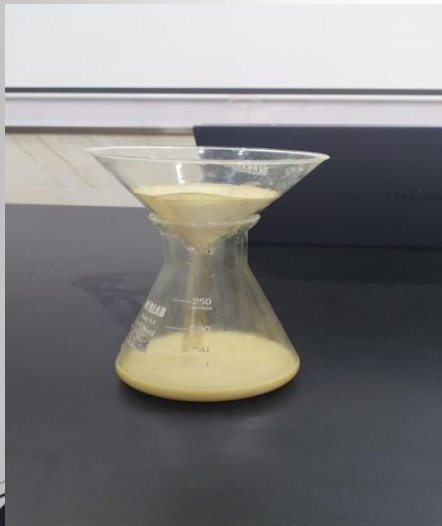
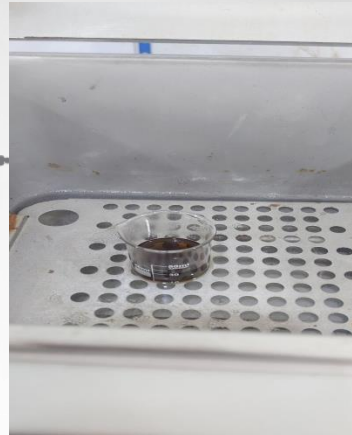
For alcoholic extract, add water to precipitate piperine and filter.

## ***Results:***

Yellow needles with melting point of *125*<sup>0</sup>C are deposited. Yielding *0.3 gm* of piperine alkaloids.

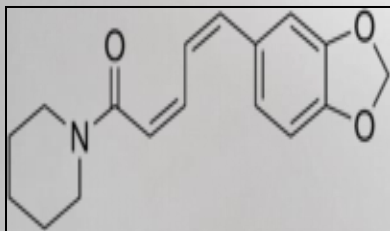




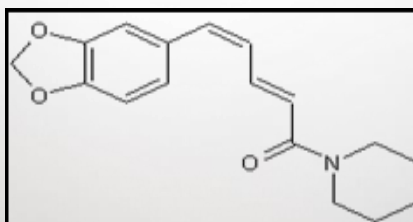


# DISCUSSION

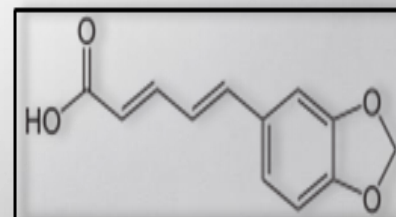
- ❖ The plant is affected by heat; therefore Soxhlet apparatus is used in its extraction.
- ❖ The use of *90% ethanol* is to extract both, the alkaloid and the alkaloidal salt that might be present. (This is true for the extraction of most alkaloids).
- ❖ The use of *alcoholic KOH* is to precipitate the isomers of piperine that are *chuvacine*, *isochuvacine* and *piperic acid*.



Chuvacine

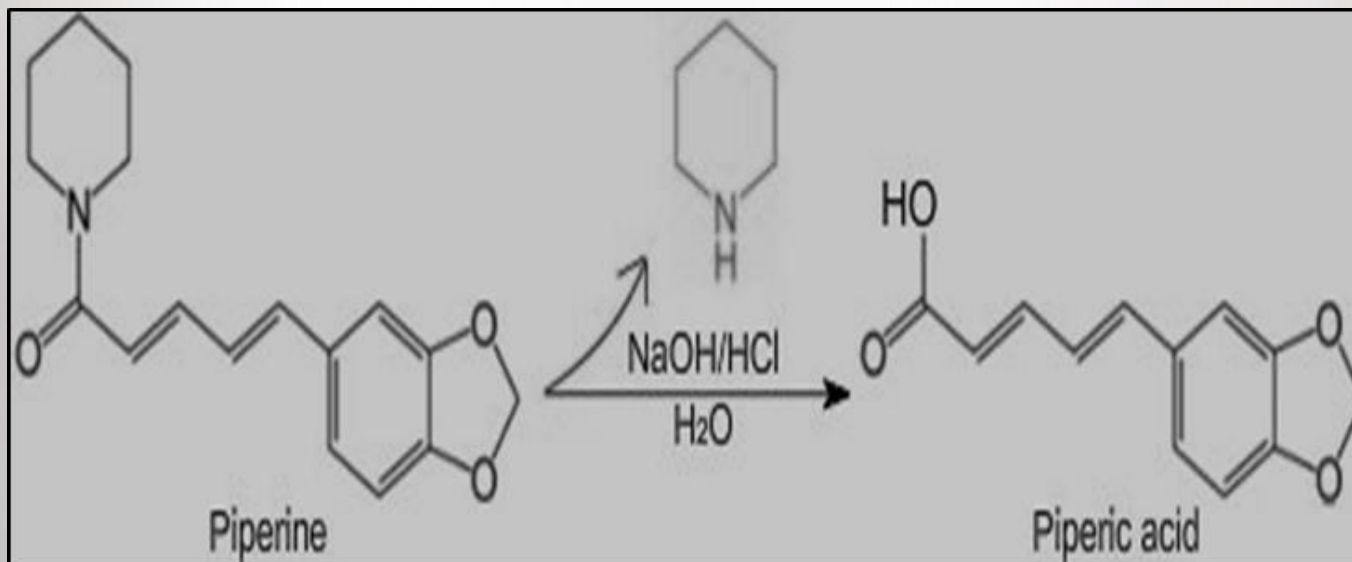


Isochuvacine



Piperic acid

❖4- Alcohol was used in the preparation of KOH instead of water, since water will hydrolyze piperidine and piperic acid as shown



Thank  
you

