Extraction of Piperine

Lab No. 2

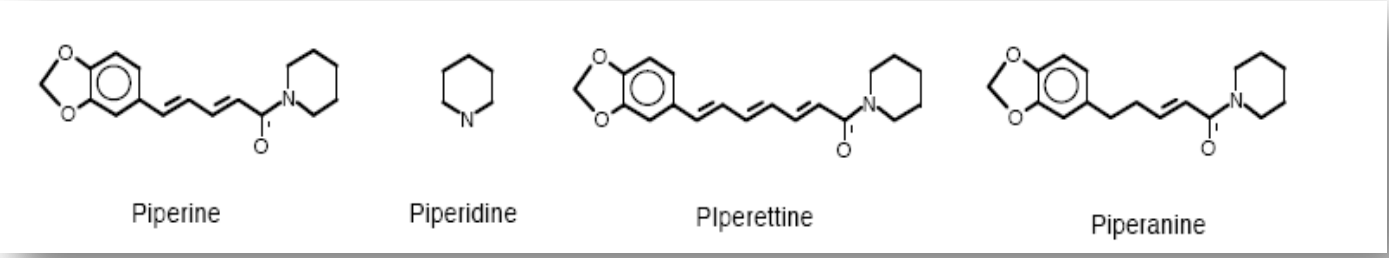
Historically, pepper has been thought to cure many illnesses such as cancer, malaria, and cholera; however, today it is most commonly used as a food additive.

Piperine is tasteless, but its stereoisomer (**chavicine)** is the active ingredient in black pepper that provides its characteristic taste. Loss of pungency during storage of black pepper is attributed to the slow isomerization of chavicine into piperine.

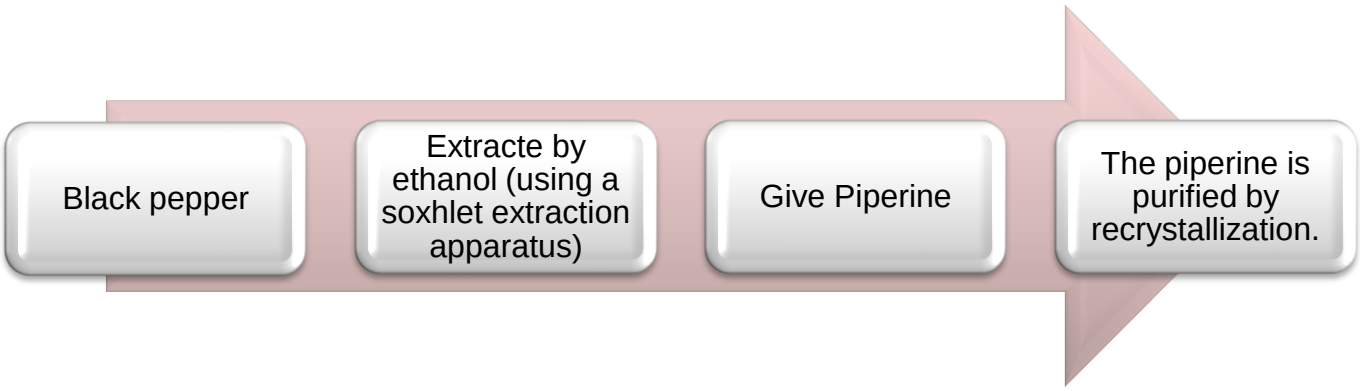
Isolation of Piperine from Black Pepper

Piperine can be isolated in good yield from ground black pepper ***Piper nigrum***, which is made up of 5-9% of alkaloids that also include **piperidine, piperettine and piperanine.**

Chemical structure for the alkaloids in *Piper nigrum:*



Principle:



Materials:

1. Soxhlet extractor.
2. Black pepper.
3. 95% ethanol.
4. 10% alcoholic KOH.

Procedure:

1. Grind (10 g) black pepper to a coarse powder.
2. Extract the ground pepper with 200 mL (95% ethanol) in a soxhlet extraction apparatus for 3hours. (The ground pepper is placed in the thimble and the ethanol in the round-bottomed flask.
3. Allow the solution to cool and filter through Whatman filter paper.
4. Concentrate the solution to remove most of the ethanol solvent. The final volume should be about (5mL).
5. Add 10mL (10% alcoholic KOH) to the residue and let stand 1 hour.
6. Decant the solution from the insoluble residue.
7. Allow the alcoholic solution to stand undisturbed overnight → long yellow needles of piperine will be deposited. (The crystals may take 24–48 hours to form.)
8. Collect the yellow needles and wash with a minimum volume of 95% ethanol.
9. Allow the crystals to air dry. Weigh them and determine the melting point. (It should be 125–126°C.).