

SNS COLLEGE OF PHARMACY AND HEALTH SCIENCES

Affiliated To The Tamil Nadu Dr. MGR Medical University, Chennai

Approved by Pharmacy Council of India, New Delhi.

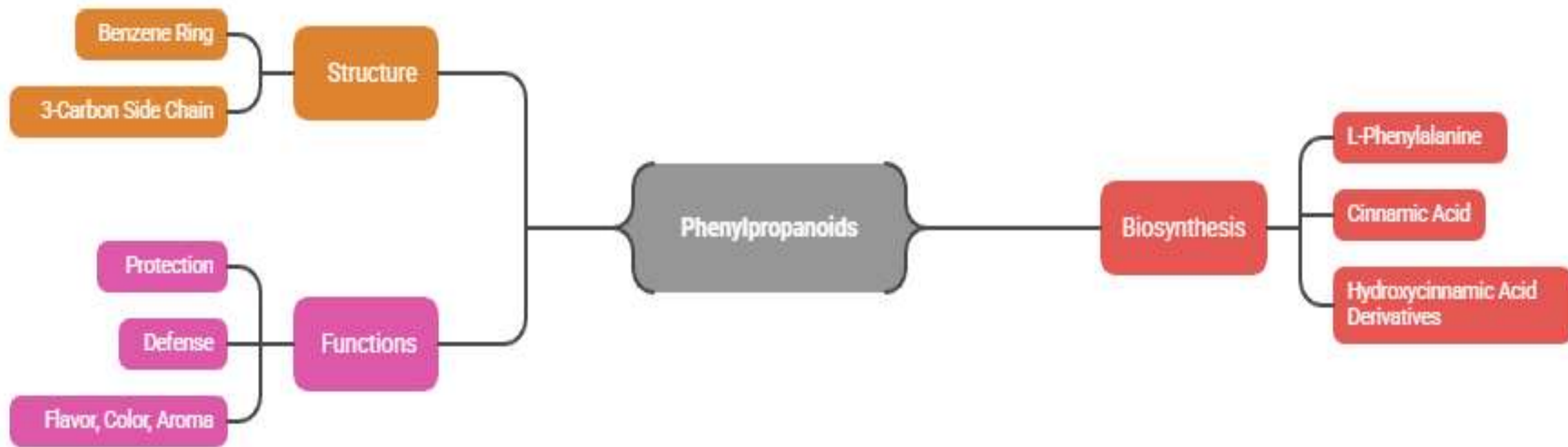
Coimbatore -641035

COURSE NAME : PHARMACOGNOSY AND PHYTOCHEMISTRY II (BP504T)

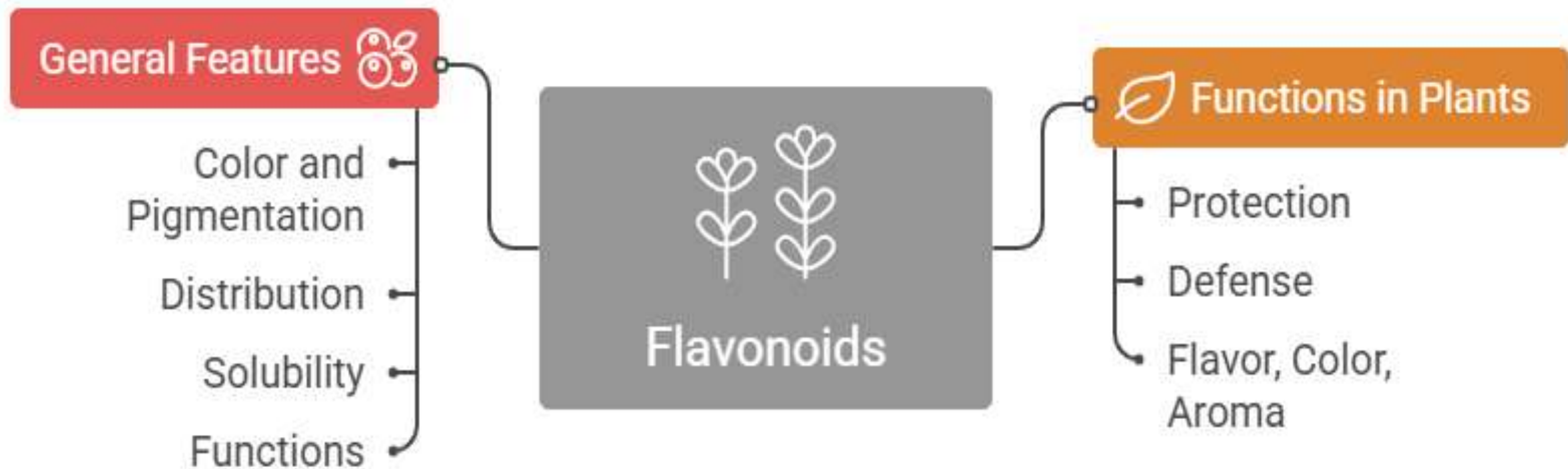
V SEM / IIIYEAR

TOPIC 1 : PHENYLPROPANOIDS & FLAVONOIDS

Phenylpropanoids: Structure, Biosynthesis, and Functions



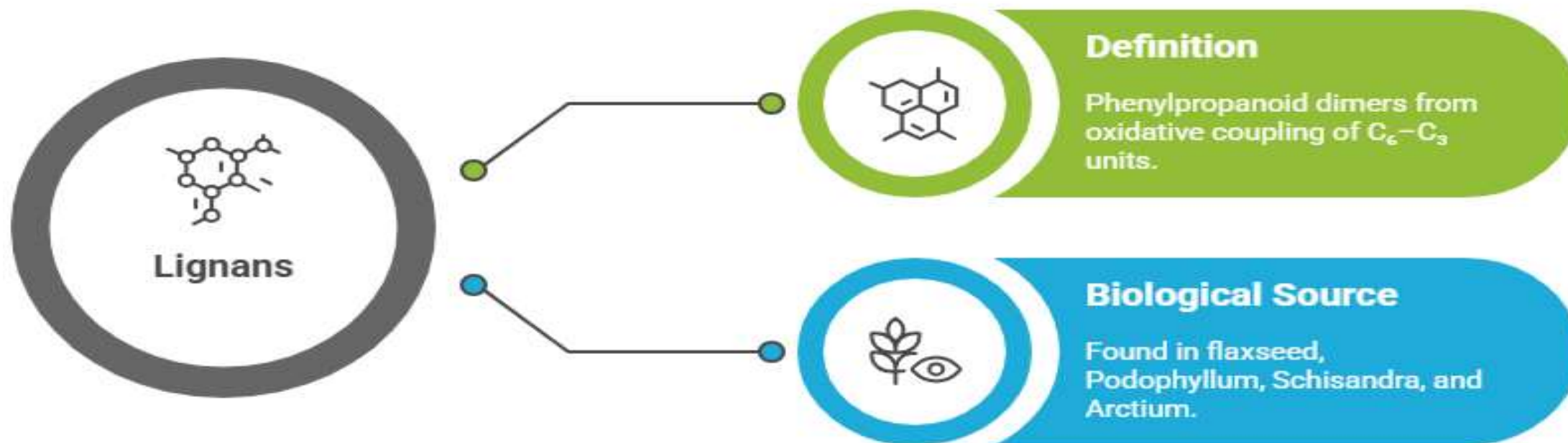
Flavonoids: Functions and Features



Flavonoid structure varies from unsaturated to saturated bonds.



Exploring the Dimensions of Lignans





Understanding Lignans

Podophyllum Source

Derived from the rhizomes and roots of Podophyllum plants.

Podophyllum Family

Belongs to the Berberidaceae family.

Common Lignans

Examples include Podophyllotoxin, Schisandrin, Sesamin, and Matairesinol.

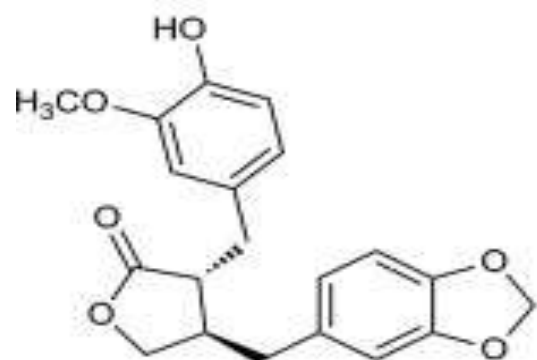
Chemical Structure

Lignans are composed of two phenylpropane units linked by a β - β' bond.

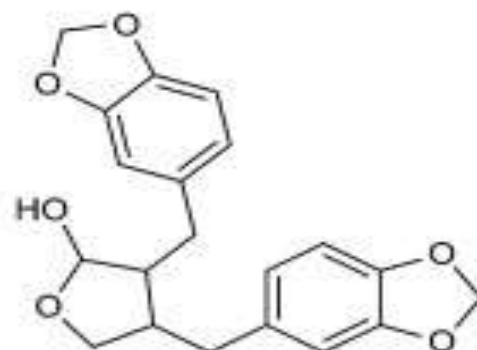


Podophyllum Constituents

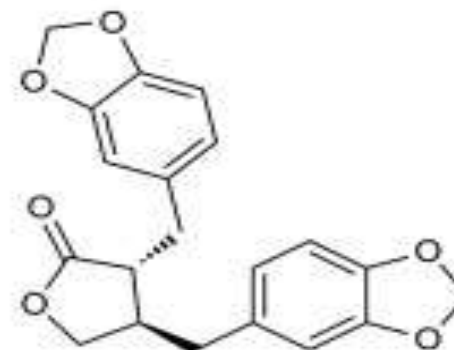
Contains lignans like podophyllotoxin, podophyllotoxone, and demethylpodophyllotoxin.



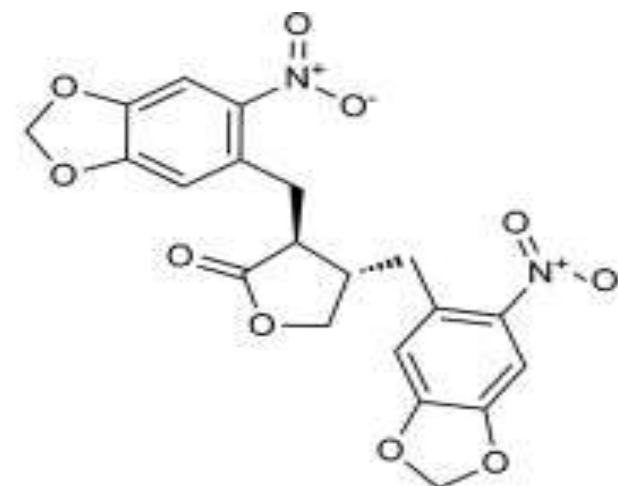
Methylpluviatolide (14)



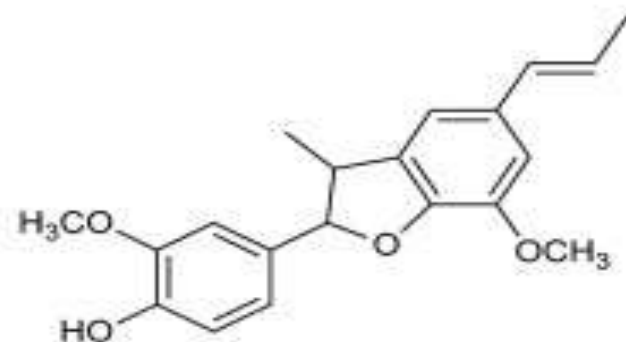
Cubebin (15)



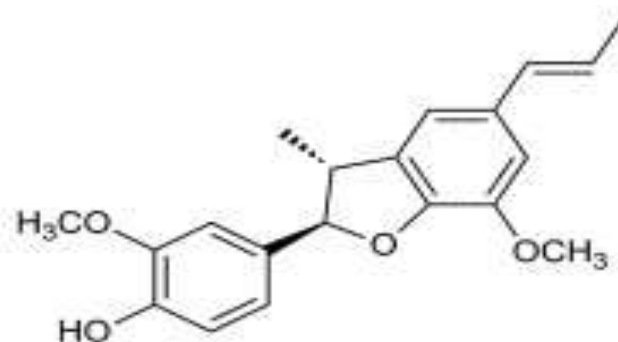
Hinokinin (16)



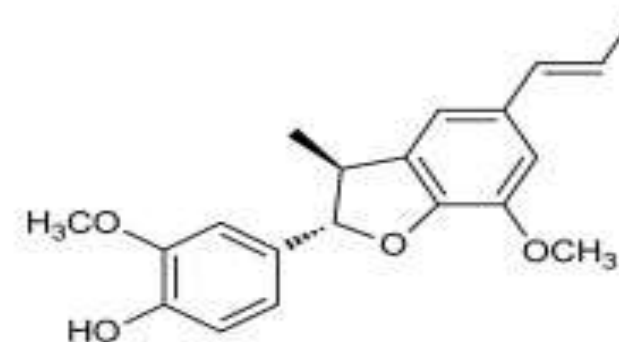
6,6'-Dinitrohinokinin (17)



(±)-Licarin A (18)



(+)-Licarin A (18A)



(-)-Licarin A (18B)

Podophyllotoxin Properties



Pharmacological Activity

Inhibits microtubule assembly, acting as antimitotic and antiviral. Semi-synthetic derivatives treat testicular cancer, lymphomas, and small-cell lung carcinoma.



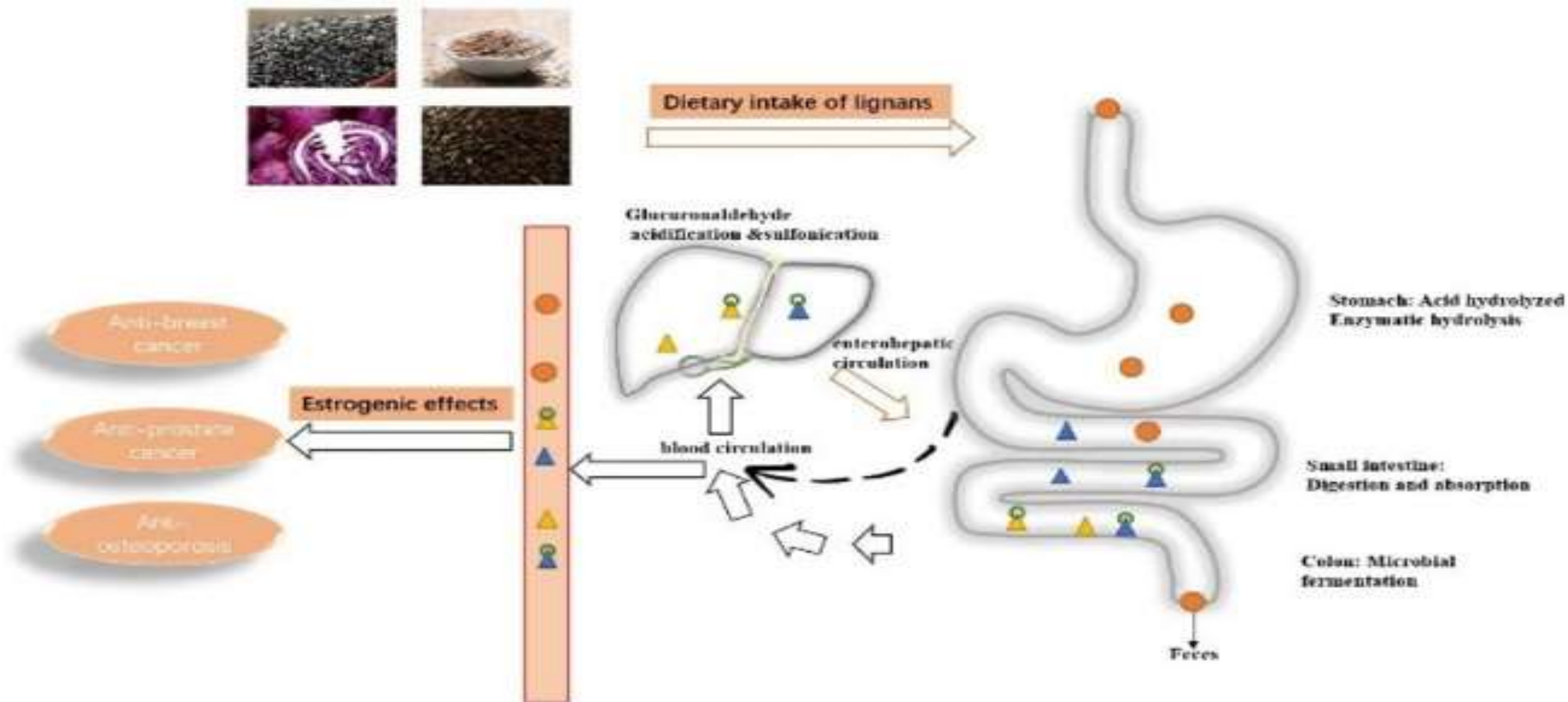
Identification Test

Lignans produce a green color with ferric chloride, indicating phenolic presence.

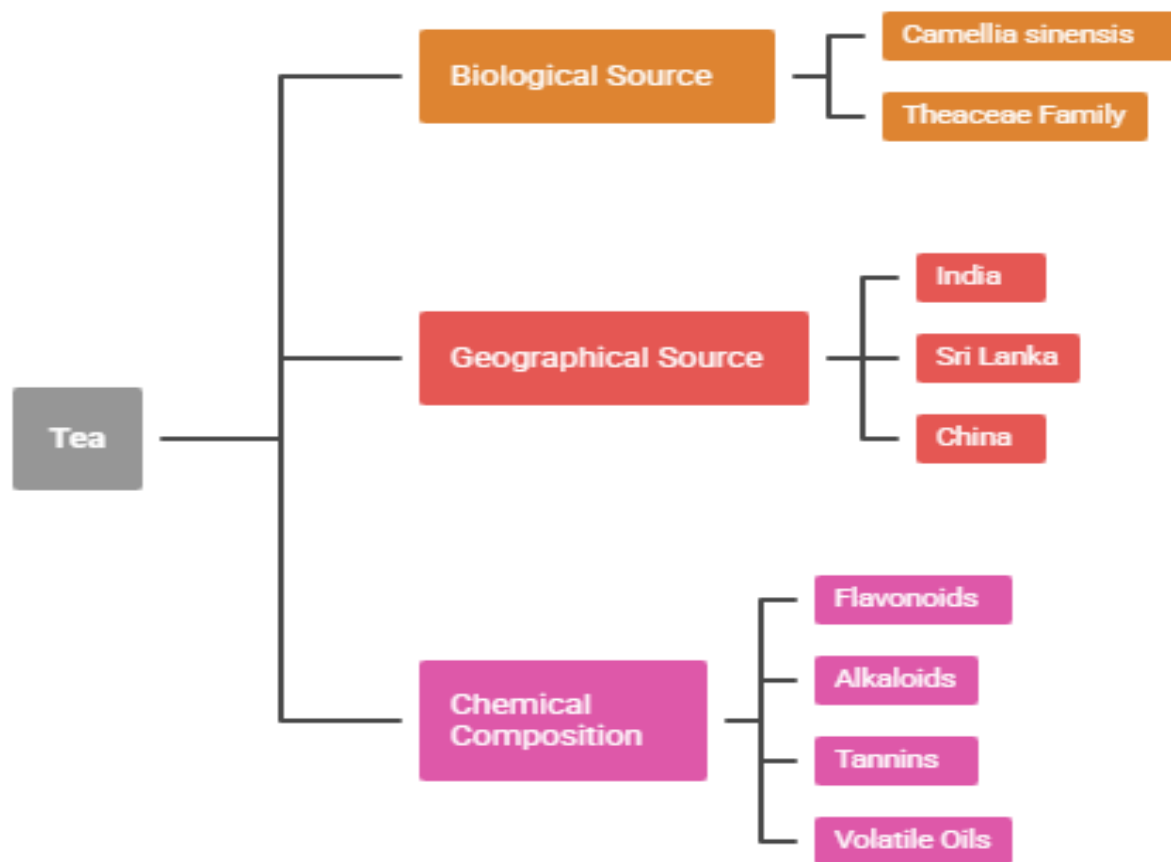


Commercial Application

Serves as a precursor for cytotoxic anticancer drugs in modern chemotherapy.



Tea: Biological Source, Geographical Distribution, and Chemical Composition



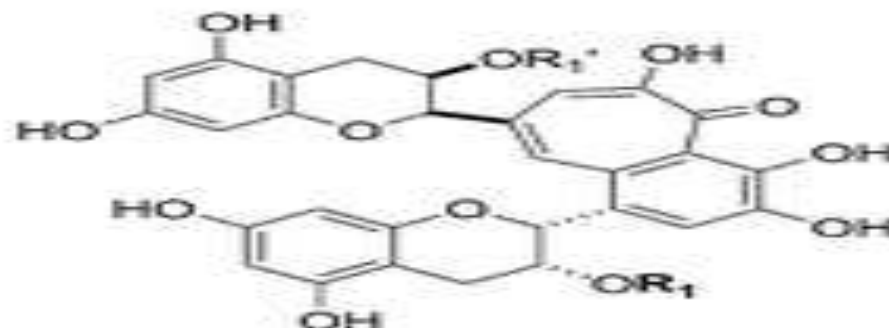
(1)



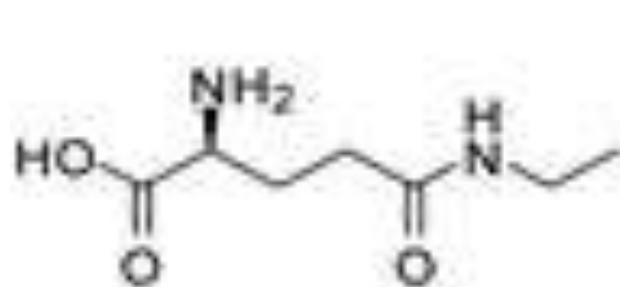
(2)



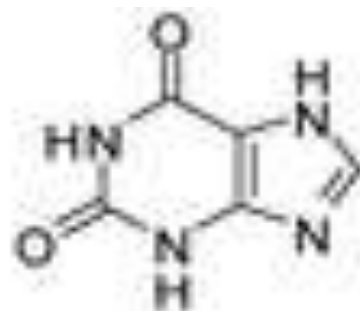
- i) Nucleophilic reaction
- ii) Oxidation, O_2 or H_2O_2
- iii) Elimination, $-CO_2$



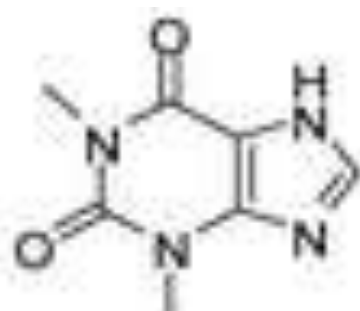
Theaflavins:
 $R_1=R_1'=H$, TF1;
 $R_1=\text{galloyl}$, $R_1'=H$, TF2a;
 $R_1=H$, $R_1'=\text{galloyl}$, TF2b;
 $R_1=R_1'=\text{galloyl}$, TF3



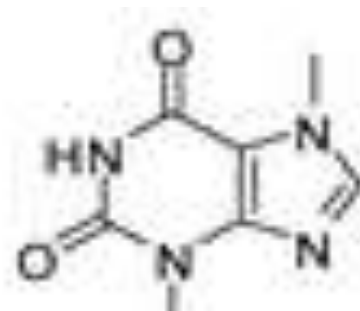
L-Theanine



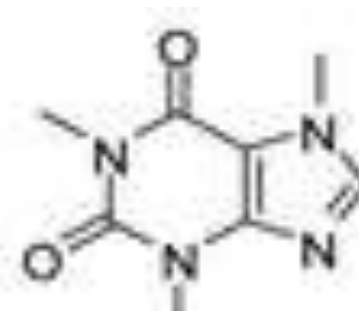
Xanthine



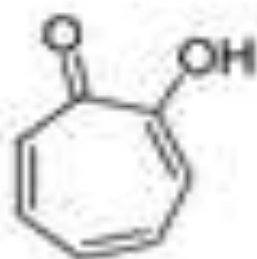
Theophylline



Theobromine

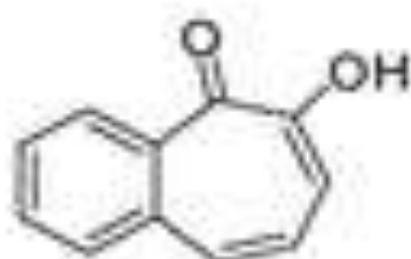


Caffeine



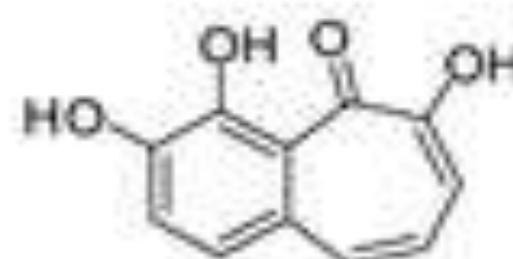
(2*E*,4*Z*,6*Z*)-2-hydroxy-cyclohepta-2,4,6-trienone

Tropolone



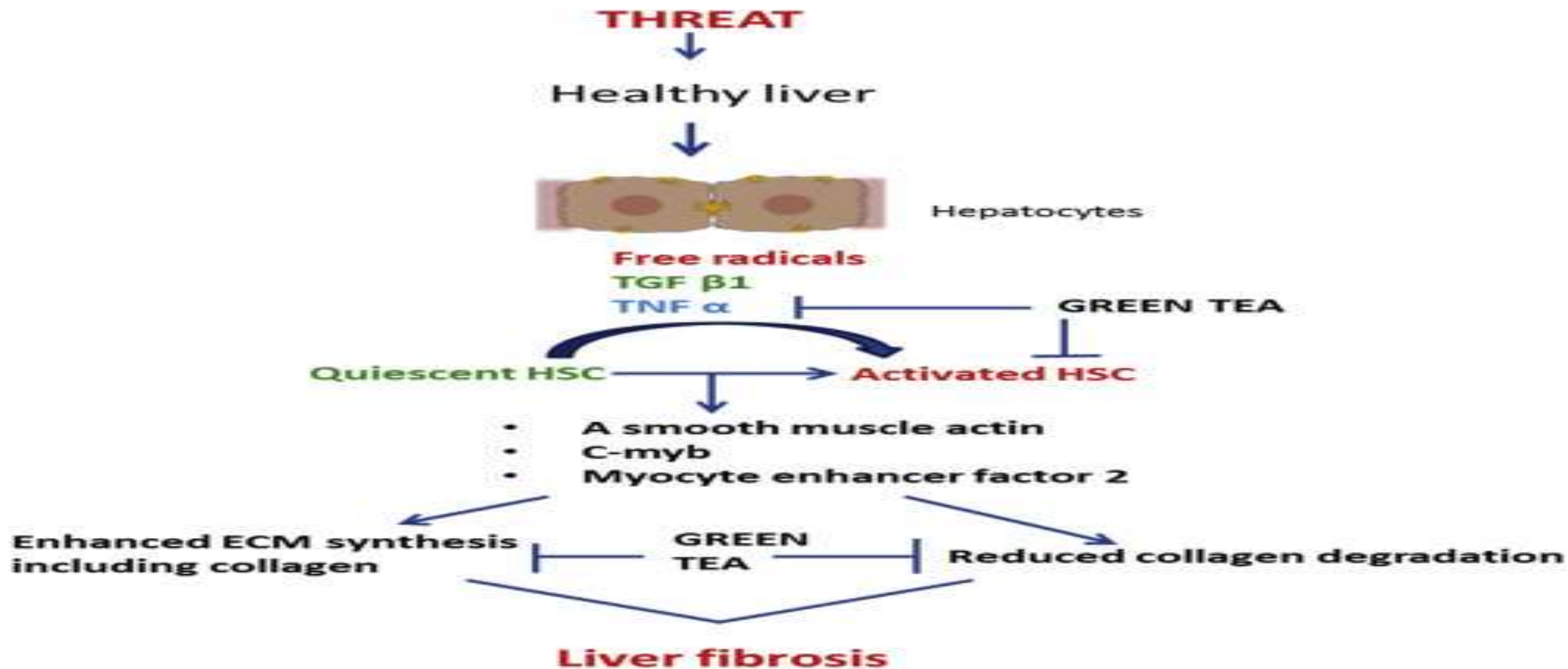
6-hydroxy-5*H*-benzo-[7]-annulen-5-one

Benztropolone



3,4,6-trihydroxy-5*H*-benzo[7]-annulen-5-one

Benztropolone core of theaflavins



Tea Properties



Chemistry and Processing

Green tea is unfermented and rich in catechins. Black tea is fermented, oxidizing catechins.



Pharmacological Actions

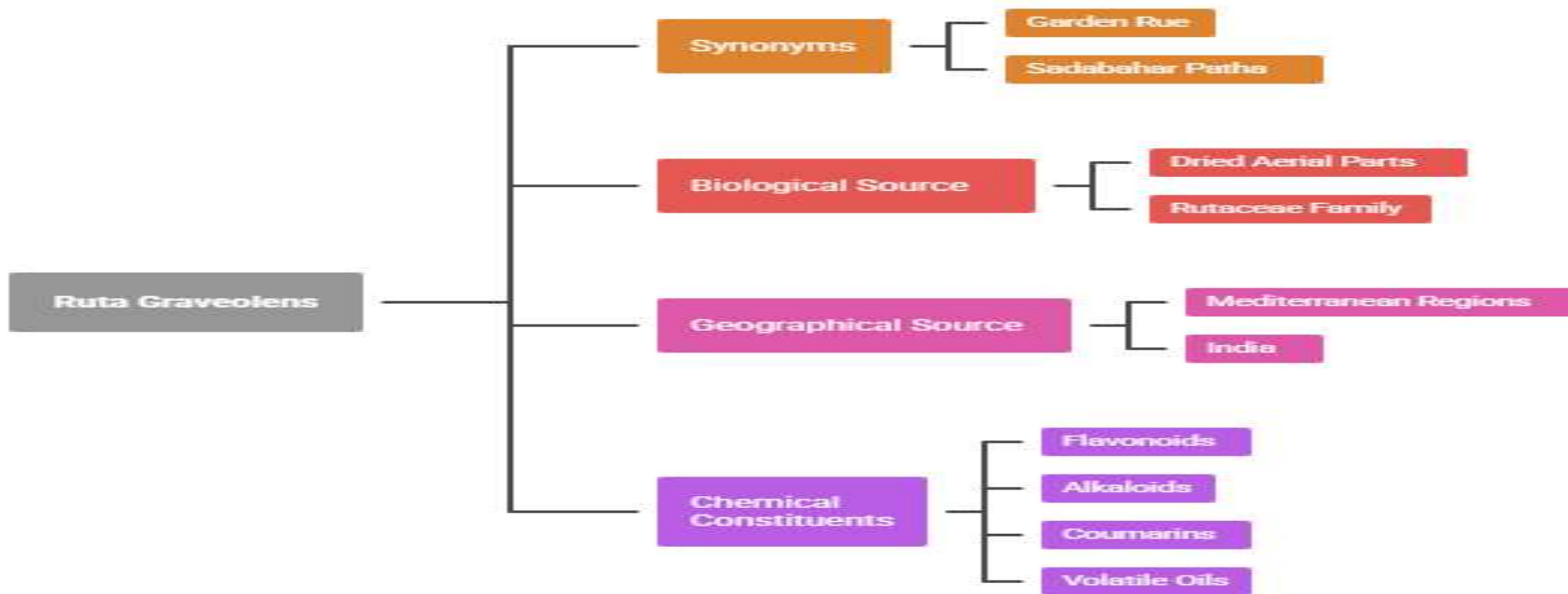
Tea acts as an antioxidant, cardioprotective agent, CNS stimulant, and antidiabetic.

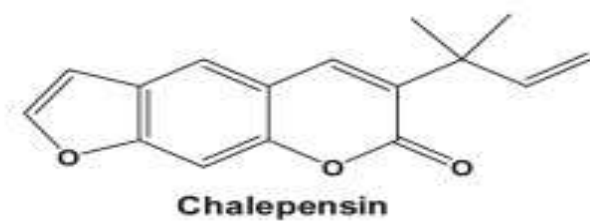
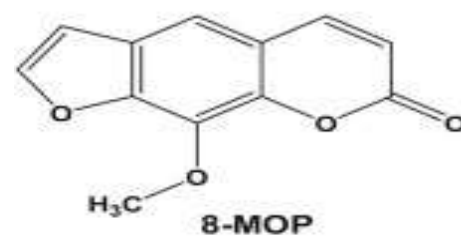
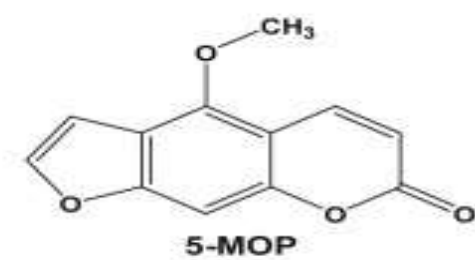
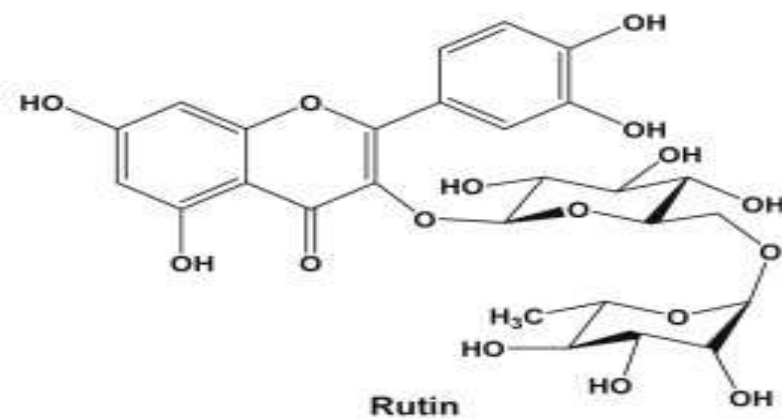


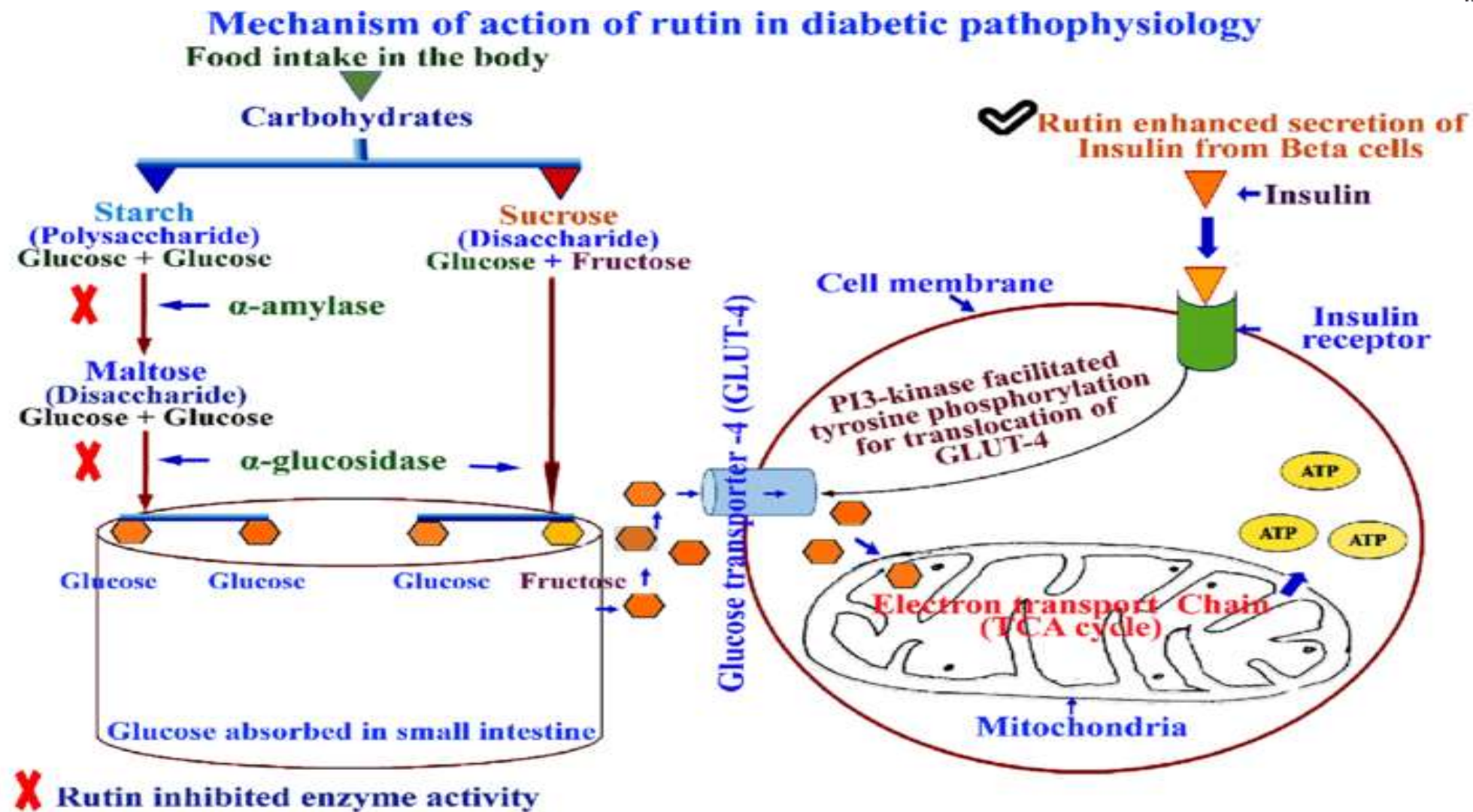
Commercial Application

Tea is used in nutraceuticals, anti-obesity formulations, and cosmetic antioxidants. EGCG is a lead compound.

Ruta Graveolens: Chemical Constituents and Sources







Rutin properties



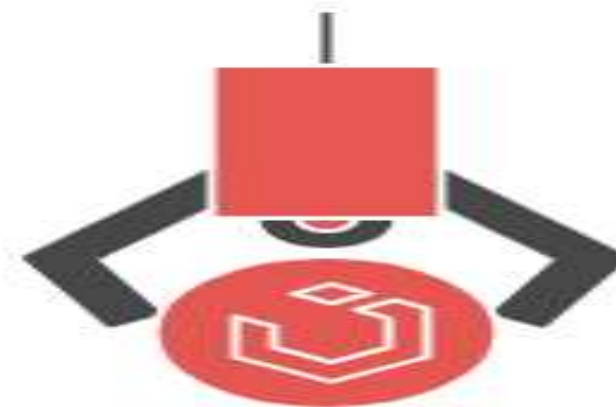
Chemistry

Rutin is a glycoside of quercetin, possessing a flavonol nucleus with sugar moieties.



Pharmacological Actions

Rutin has capillary stabilizing, antioxidant, anti-inflammatory, and antispasmodic properties. It enhances vitamin C utilization.



Commercial Application

Rutin is used in vitamin P formulations, anti-hemorrhoidal drugs, and cosmeceuticals for antioxidant benefits.

ASSESSMENT QUESTIONS

01

Lignans

Lignans are biosynthetically derived from which of the following units?

- A. Isoprene units
- B. Acetate units
- C. Shikimic acid units
- D. **Two phenylpropanoid (C_6-C_3) units**

02

Ruta

Rutin is chemically classified as:

- A. Isoflavone
- B. Chalcone
- C. **Flavonol glycoside**
- D. Anthocyanidin

03

Tea

The major polyphenolic constituent responsible for the antioxidant activity of green tea is:

- A. Caffeine
- B. Theophylline
- C. **Epigallocatechin gallate (EGCG)**
- D. Tannic acid

