



MSA UNIVERSITY

جامعة أكتوبر للعلوم الحديثة والآداب

Pharmacognosy

PHG112

3 GOOD HEALTH
AND WELL-BEING



4 QUALITY
EDUCATION



Course Instructors

Assoc. Prof. Dr. Soumaya Saad Zaghloul
Pharmacognosy
[szaghloul@ msa.edu.eg](mailto:szaghloul@msa.edu.eg)

Dr. Passant Mohamed
Lecturer of Pharmacognosy
pabdelbaki@msa.edu.eg

Office: G42

References

Author	Date	Title	Publisher	ISBN
Michael Heinrich, Joanne Barnes, Simon Gibbons, Elizabeth M. Williamson.	2012	Fundamentals of Pharmacognosy and Phytotherapy	Elsevier Health Sciences	0702052310, 9780702052316
Biren Shah, Avinash Seth	2012	Textbook of Pharmacognosy and Phytochemistry	Elsevier Health Sciences	8131232603, 9788131232606
William Charles Evans	2009	Trease's Pharmacognosy, 16th edition	Elsevier Health Sciences	0702041890, 9780702041891



Lecture 4

Introduction to Fruits *Introduction to Family* *Umbelliferea*

Interactive teaching methods and activities



QUIZIZZ



socrative

Learning Outcomes

By the end of this lecture, students should be able to:

Knowledge / Remembering

- **Define** a fruit as the product of the development of the gynoecium after fertilization.
- **Identify** the general morphological features of fruits (apex, base, stylopod, carpophore).
- **List** the classification of umbelliferous fruits (true, simple, dry, schizocarpic, cremocarp).
- **Recognize** the botanical origin and family of *Ammi visnaga* and *Ammi majus*.
- **Recall** the main active constituents of *Ammi visnaga* and *Ammi majus*.

Comprehension / Understanding

- **Explain** the structure of a cremocarp and how it splits into two mericarps.
- **Describe** the histological features of umbelliferous fruits
- **Discuss** the difference between *Ammi visnaga* and *Ammi majus* based on morphological and histological features.
- **Summarize** the pharmacological actions of khellin and psoralene.

Learning Outcomes

By the end of this lecture, students should be able to:

3. Application

- **Apply** morphological characters (carpophore type, stylopod shape, ridges) to distinguish between *Ammi visnaga* and *Ammi majus*.
- **Use** chemical tests (NaOH test, UV fluorescence) to identify each drug.
- **Relate** the presence of bitter principles or furocoumarins to their therapeutic uses.

4. Analysis

- **Differentiate** between true and false fruits with examples.
- **Compare** the vascular bundle arrangement and mesocarp structure of the two Ammi species.
- **Analyze** the therapeutic indications and side effects of each fruit drug

Learning Outcomes

By the end of this lecture, students should be able to:

5. Synthesis / Creating

- **Construct** a labeled diagram of a typical cremocarp showing stylopod, mericarps, ridges, and carpophore.
- **Design** a comparison table summarizing origin, morphology, histology, constituents, uses, and chemical tests.

6. Evaluation

- **Evaluate** the clinical importance of *Ammi visnaga* in bronchial asthma and angina.
- **Assess** the risk-benefit ratio of using psoralene-containing preparations in skin disorders.
- **Judge** the importance of morphological and histological identification in preventing adulteration.



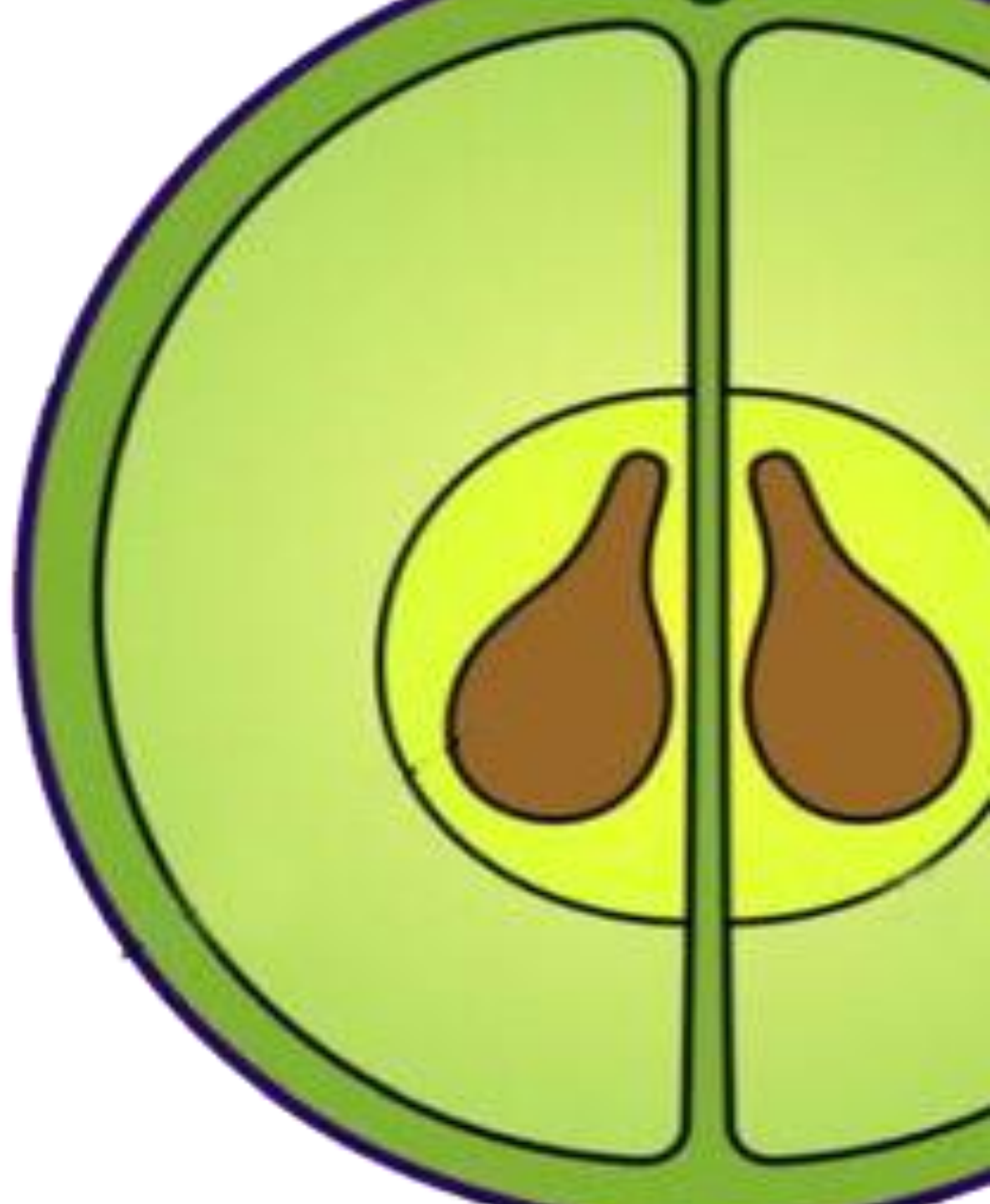
Introduction to Fruits

Fruit Formation

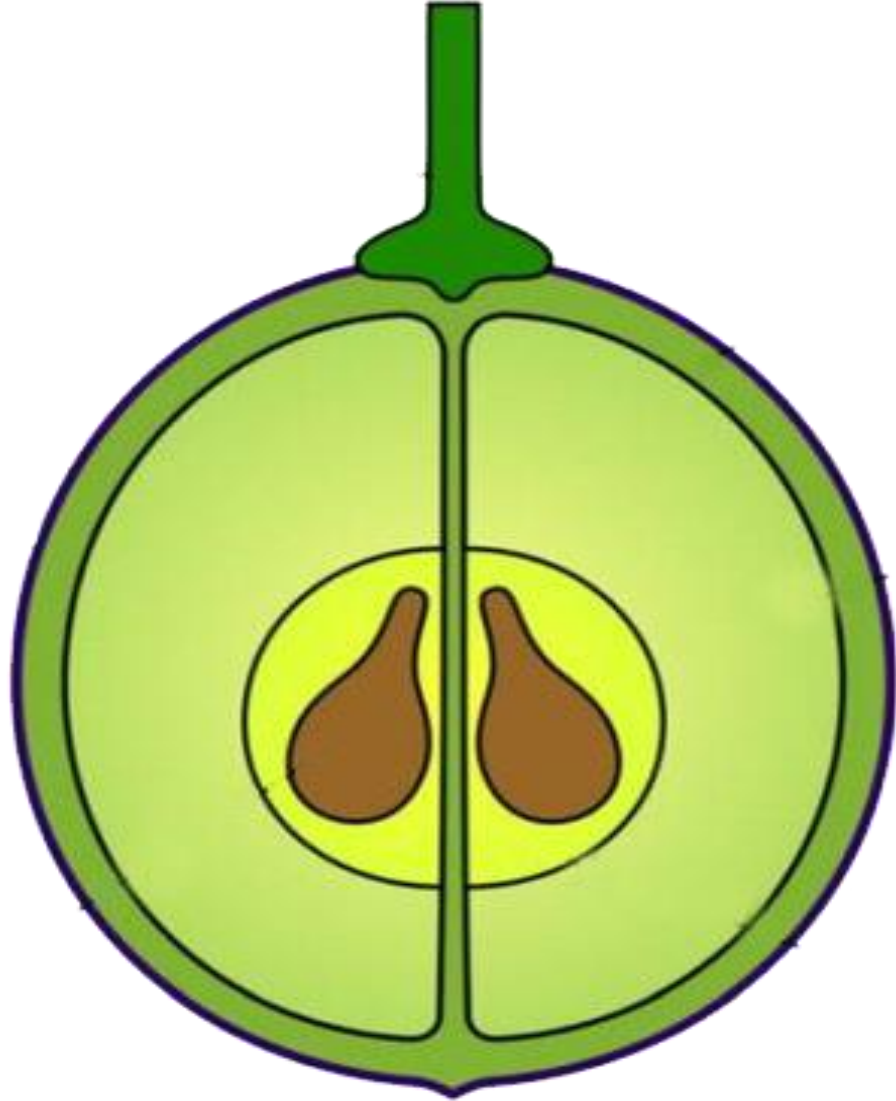


The Fruit

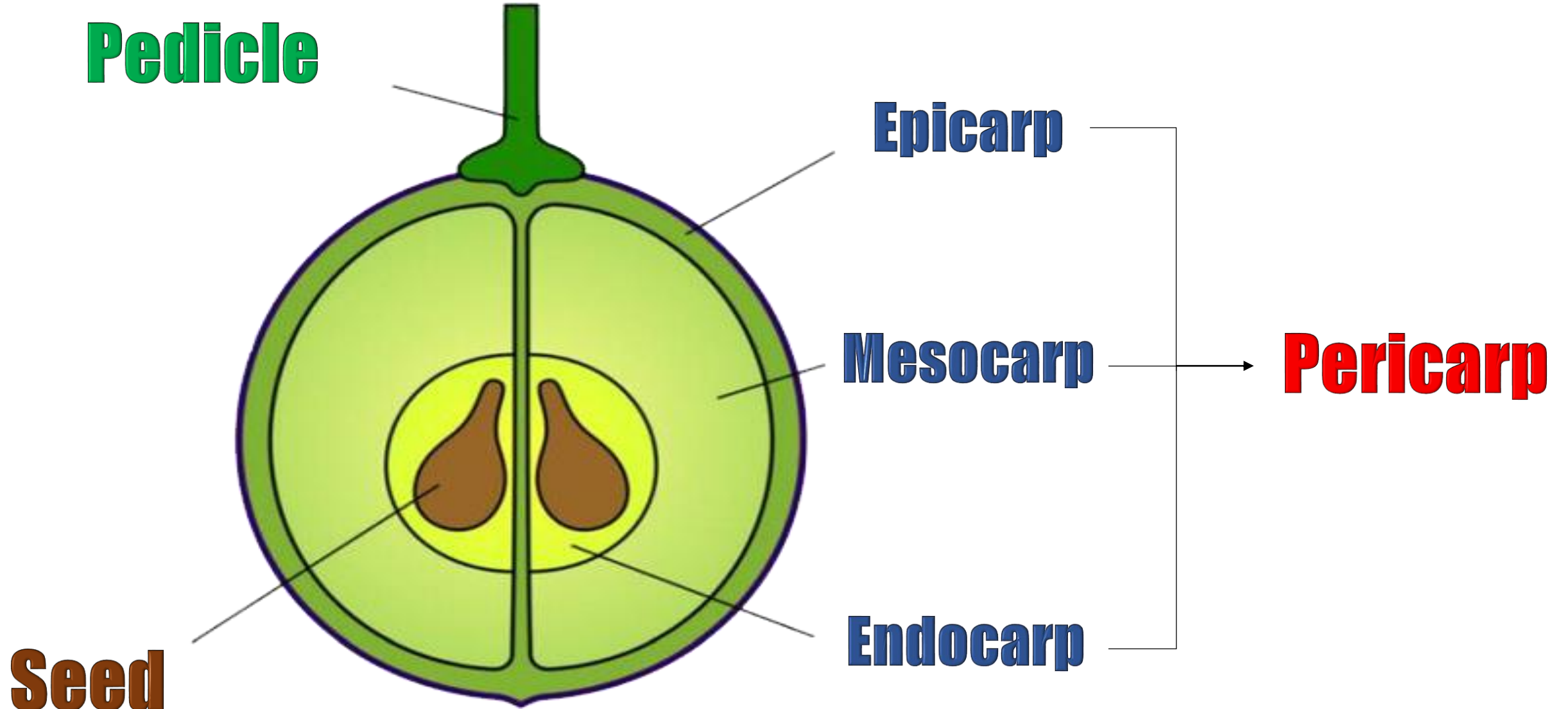
The whole product of the development of the **gynaecium** as a result of fertilization



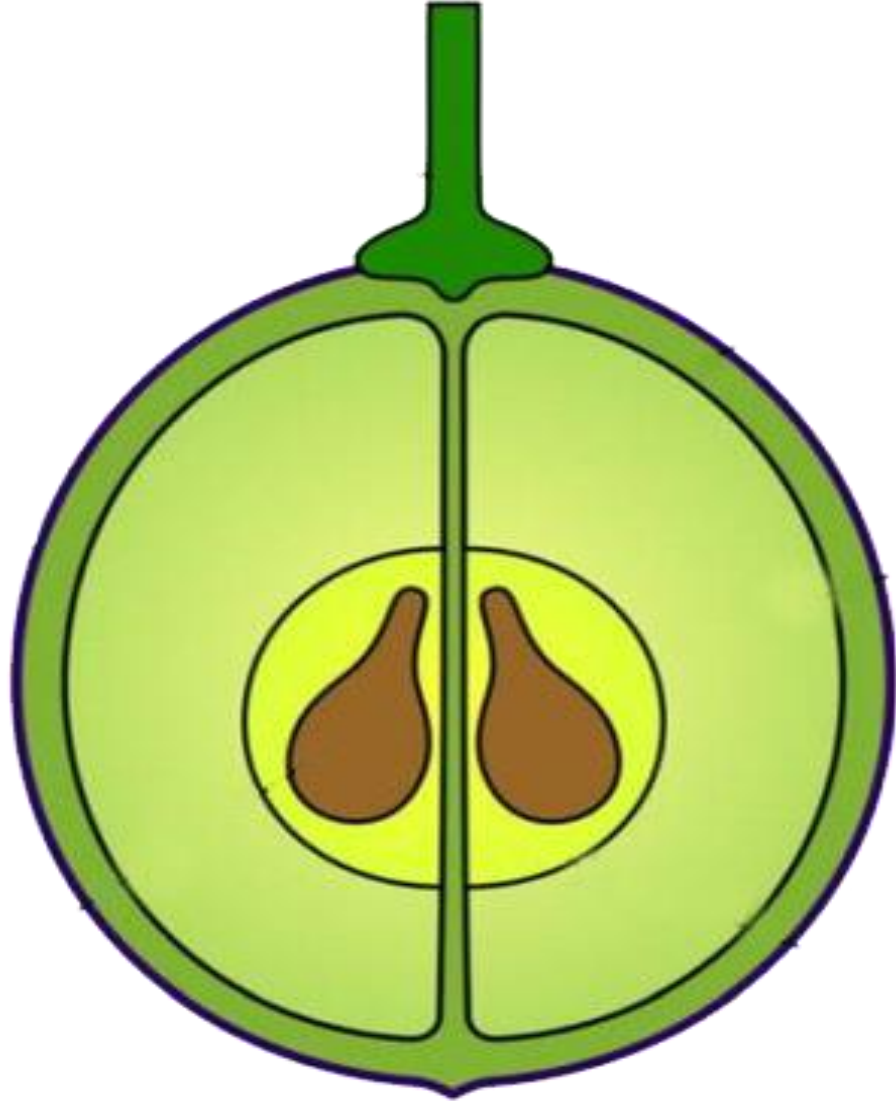
Parts of the Fruit

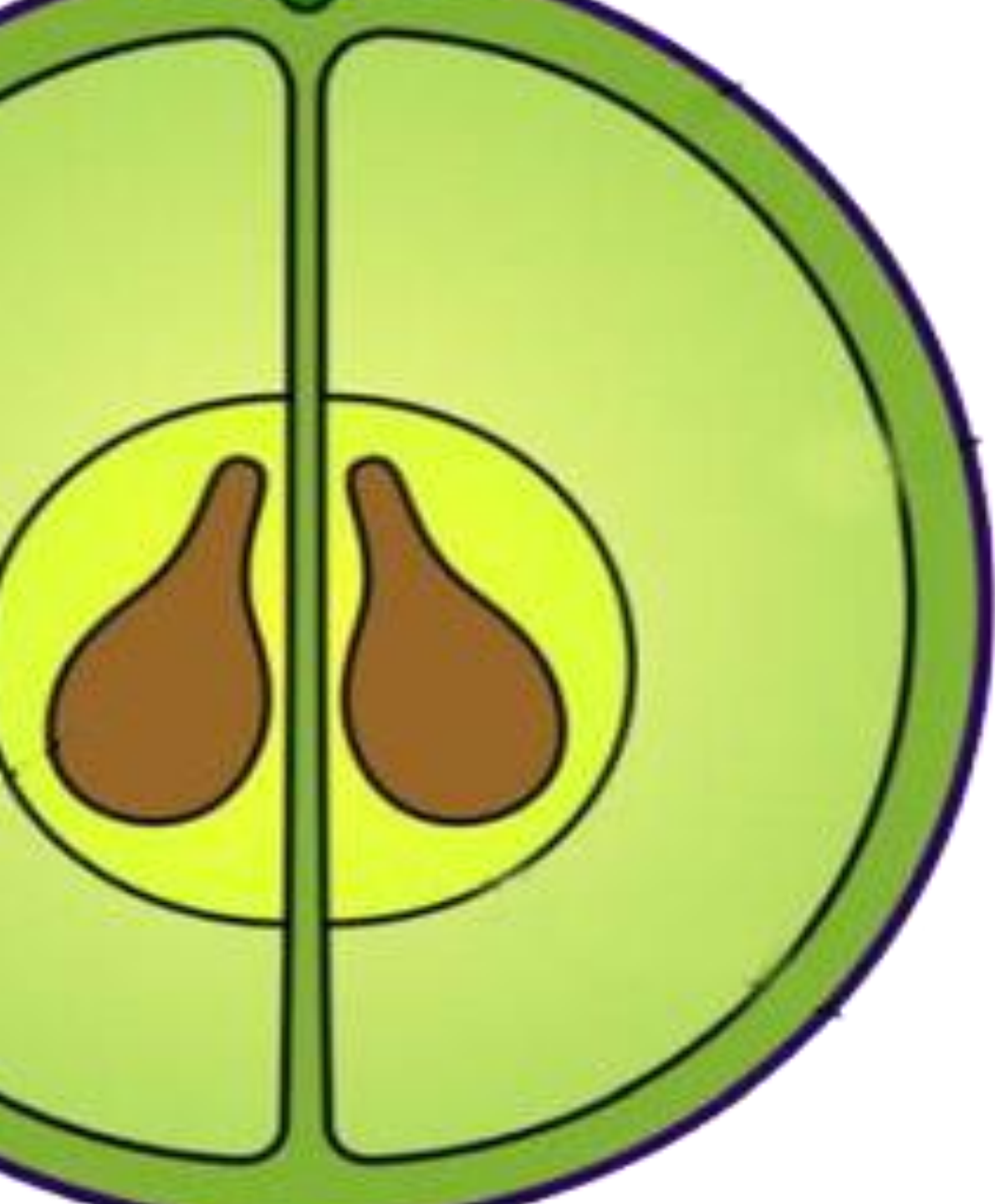


Parts of the Fruit



Parts of the Fruit

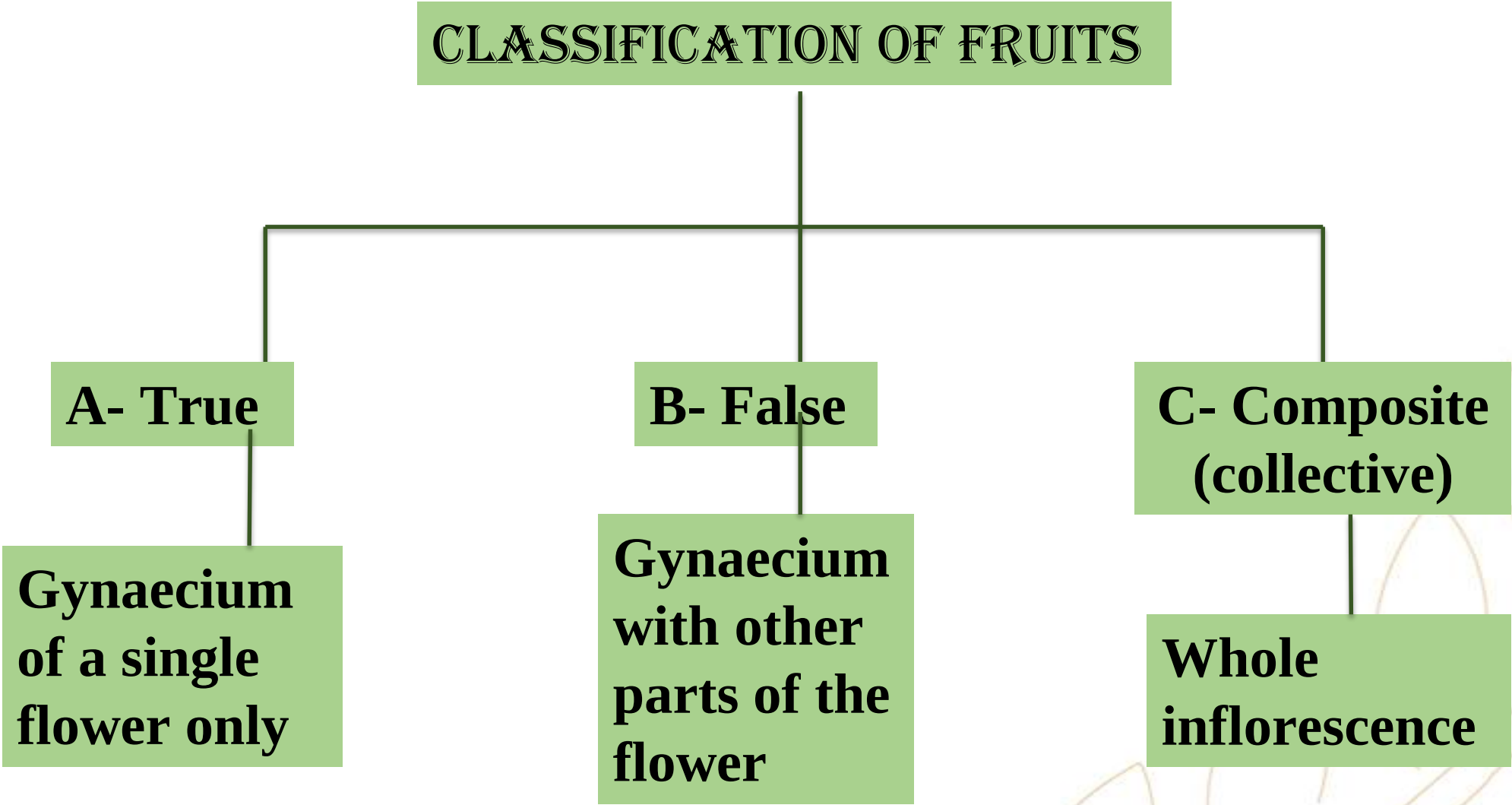




Pericarp

The fruit wall enclosing the seed and is typically made up of three distinct layers: the **epicarp**, which is the outermost layer; the **mesocarp**, which is the middle layer; and the **endocarp**, which is the inner layer surrounding the ovary or the seeds.

CLASSIFICATION OF FRUITS



```
graph TD; A[CLASSIFICATION OF FRUITS] --> B[A- True]; A --> C[B- False]; A --> D[C- Composite (collective)]; B --> E[Gynaecium of a single flower only]; C --> F[Gynaecium with other parts of the flower]; D --> G[Whole inflorescence];
```

The diagram is a hierarchical flowchart titled 'CLASSIFICATION OF FRUITS'. It branches into three main categories: A- True, B- False, and C- Composite (collective). Category A leads to 'Gynaecium of a single flower only'. Category B leads to 'Gynaecium with other parts of the flower'. Category C leads to 'Whole inflorescence'. The background features a faint, stylized illustration of a plant with large, pointed leaves.

A- True

**Gynaecium
of a single
flower only**

B- False

**Gynaecium
with other
parts of the
flower**

**C- Composite
(collective)**

**Whole
inflorescence**

CLASSIFICATION OF FRUITS

A- True

I- Simple
(one carpel or
united carpels)



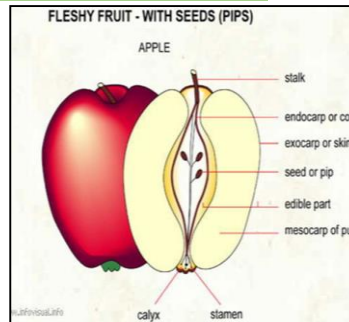
Of achenes

II- Aggregate
(free carpels)



Of follicles

B- False



C- Composite (collective)

Synconium



Figs

Sorosis



Mulberry

I- Simple Fruits

Dry
(Leathery or
woody pericarp)

Succulent
(Fleshy pericarp)

Nuts

Anise

Indehiscent

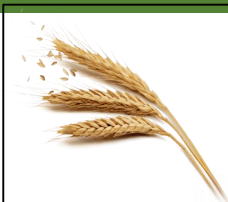
Dehiscent

Wheat Grain

Schizocarpic

Berry

Drupe



Pericarp

Dry



Wheat Grain



Cardamom



Nuts

Succulent



Capsicum



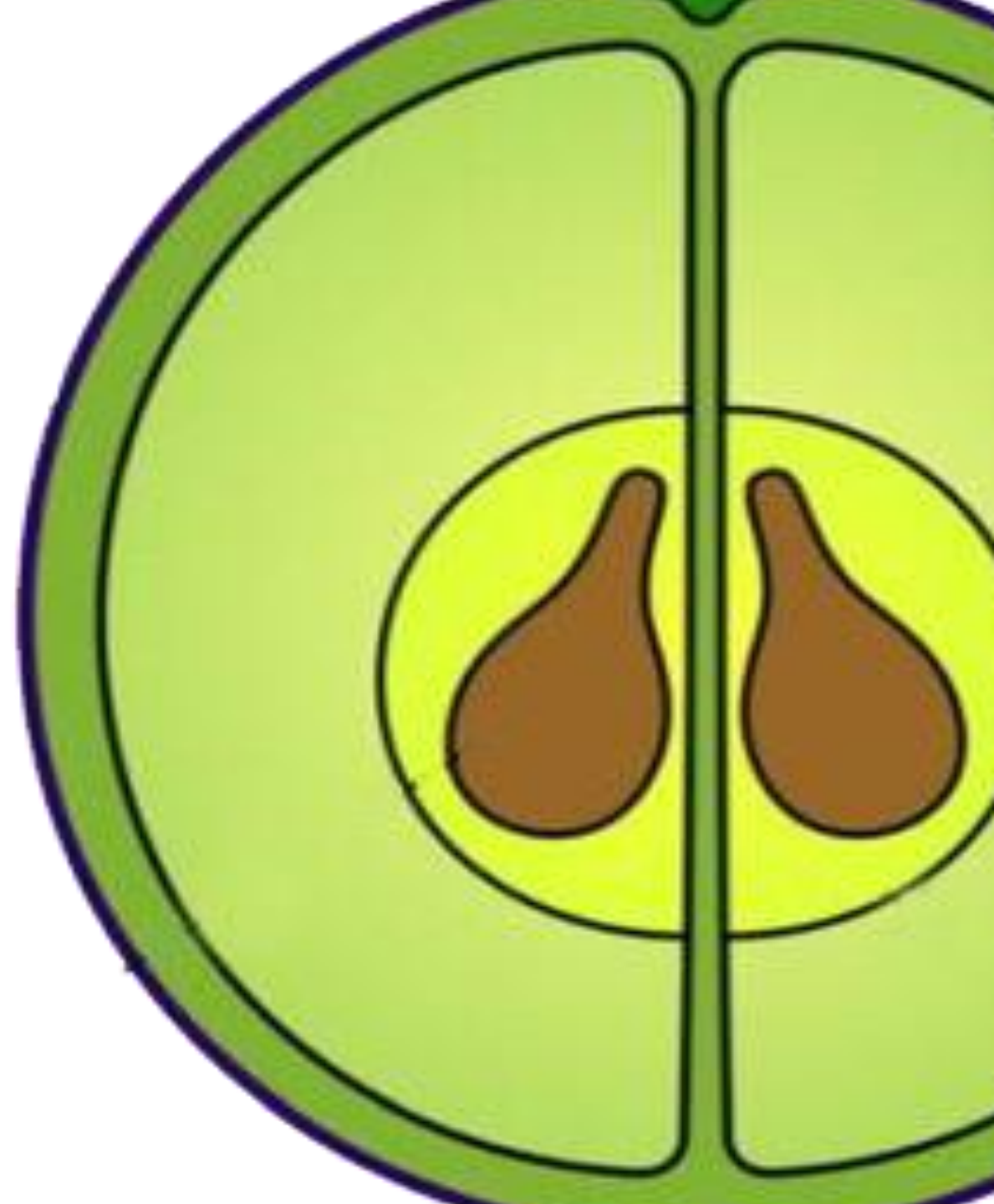
Orange



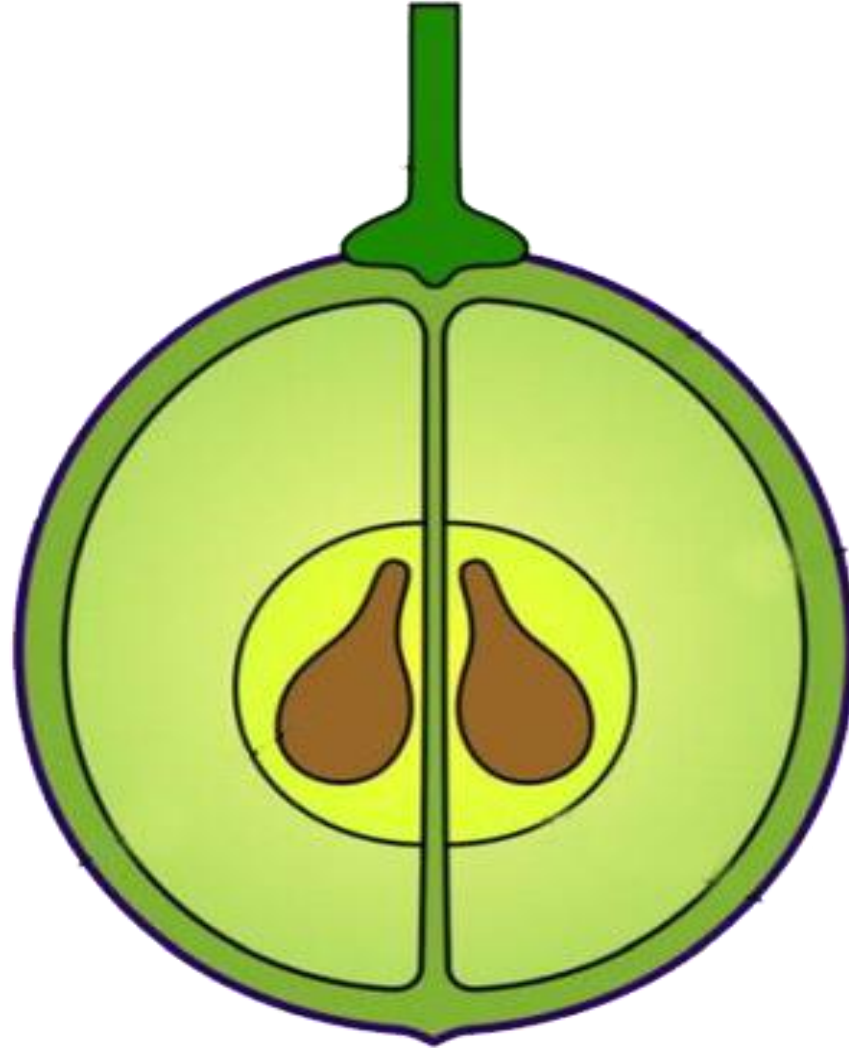
Tomatoes

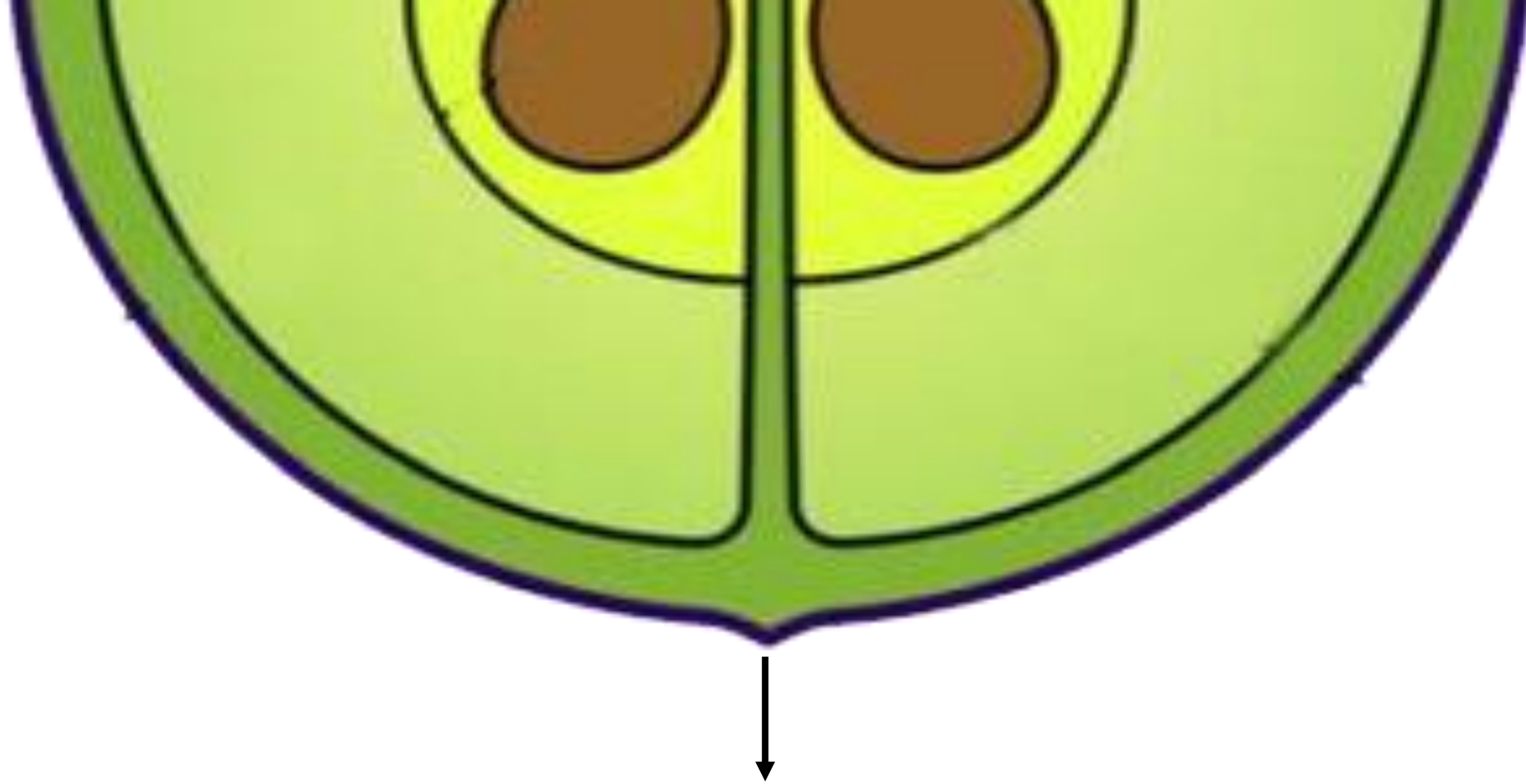
Seeds

Mature fertilized plant **ovules** and they are considered the unit of reproduction of a flowering plant, capable of developing into another such plant



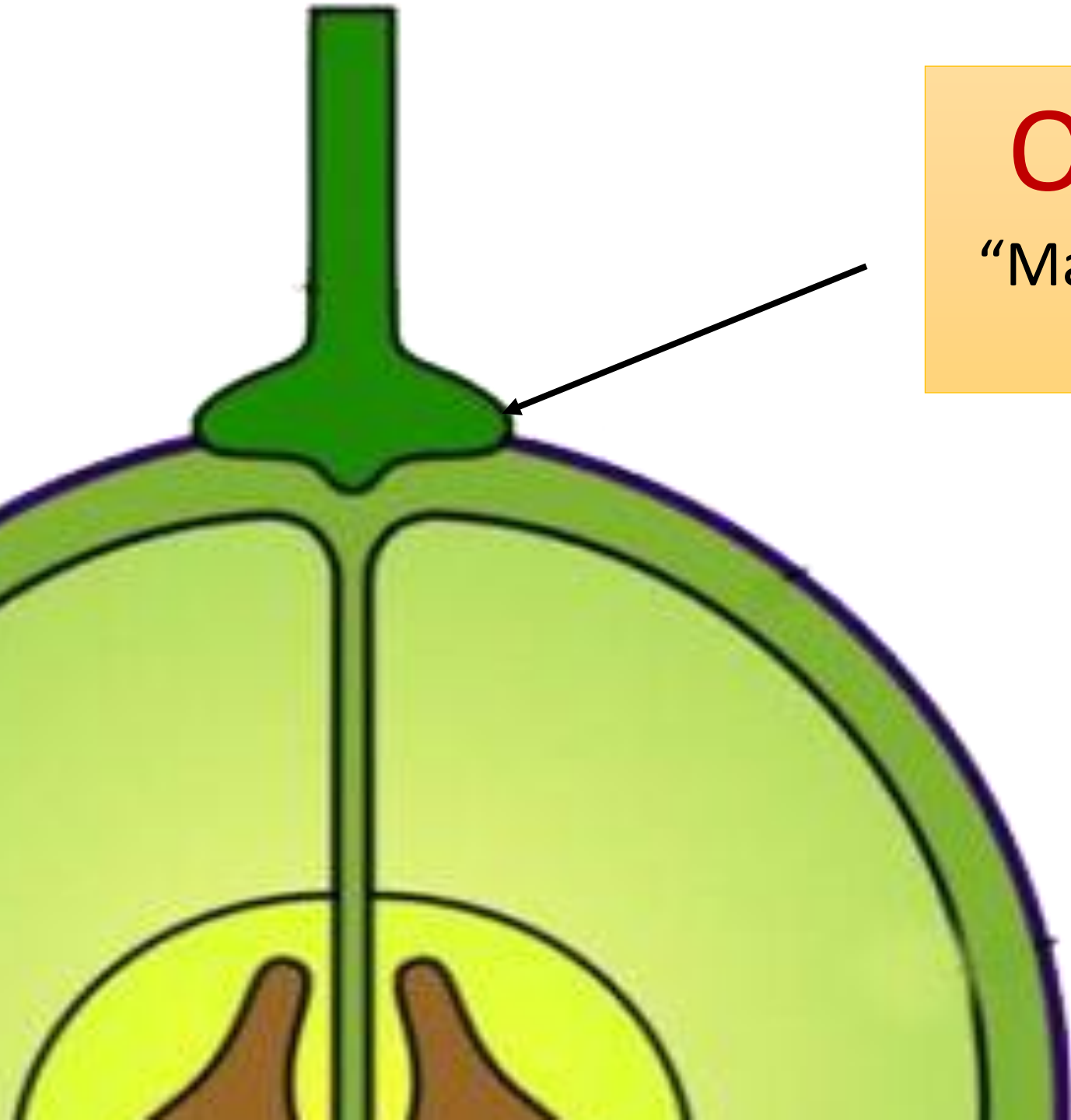
Fruit Scars





Apical and minute

“Marking the remains of style and stigma.”

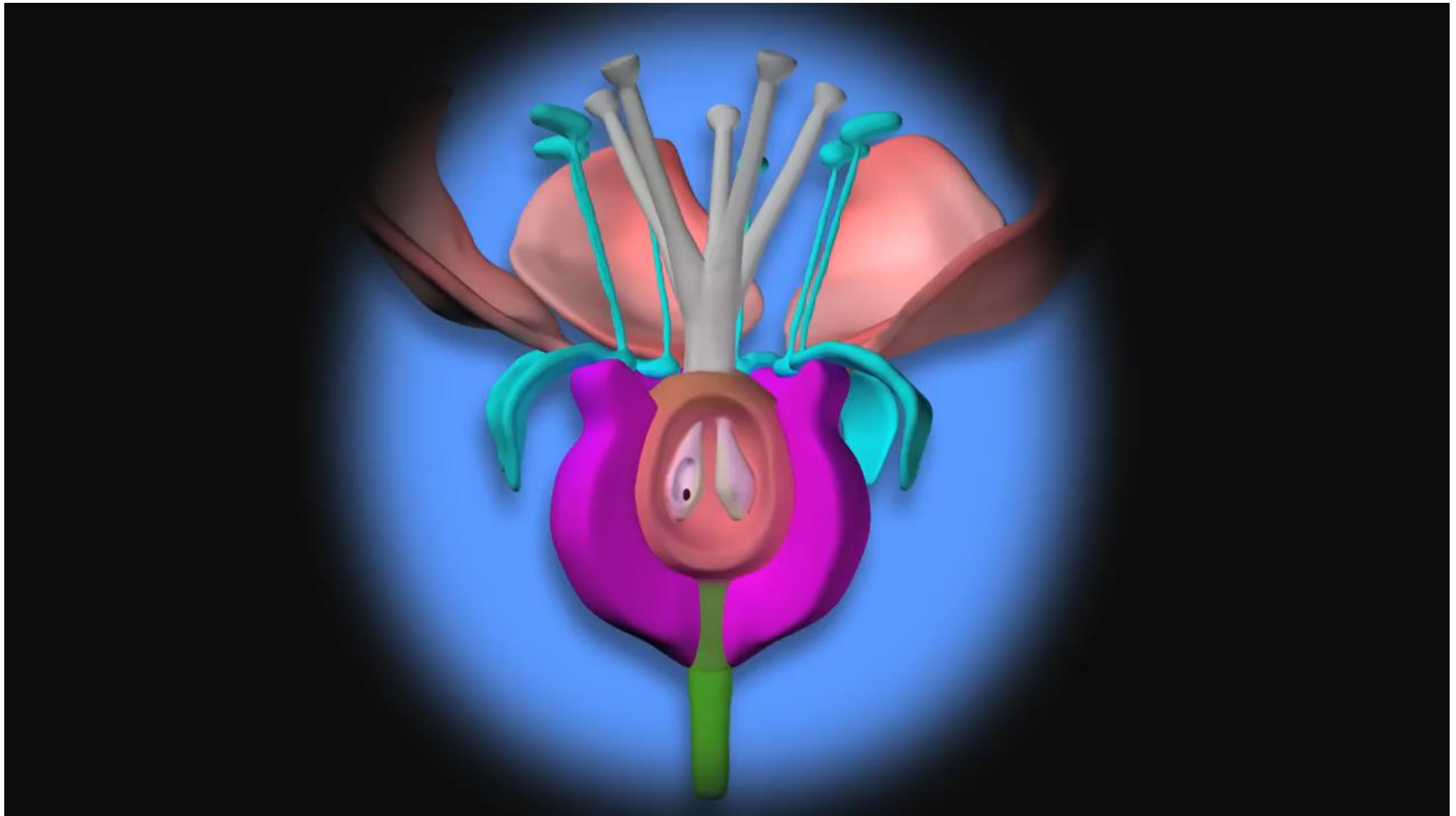


One at the base

“Marking the attachment to the stalk or parent plant”

Sometimes **other parts**
of the flower in
addition to the
gynaecium participate
in the production of
the fruit.





False Fruit

False Fruit



Apple



Pear



Introduction to Family Umbelliferea

Family Umbelliferaea



Fennel



Anise



Ammi visnaga

Type of fruit: True, Dry, Simple, Schizocarpic

Name of fruit: Cremocarp

General characters of family Umbellifereae



General characters of family Umbellifereae

Morphology

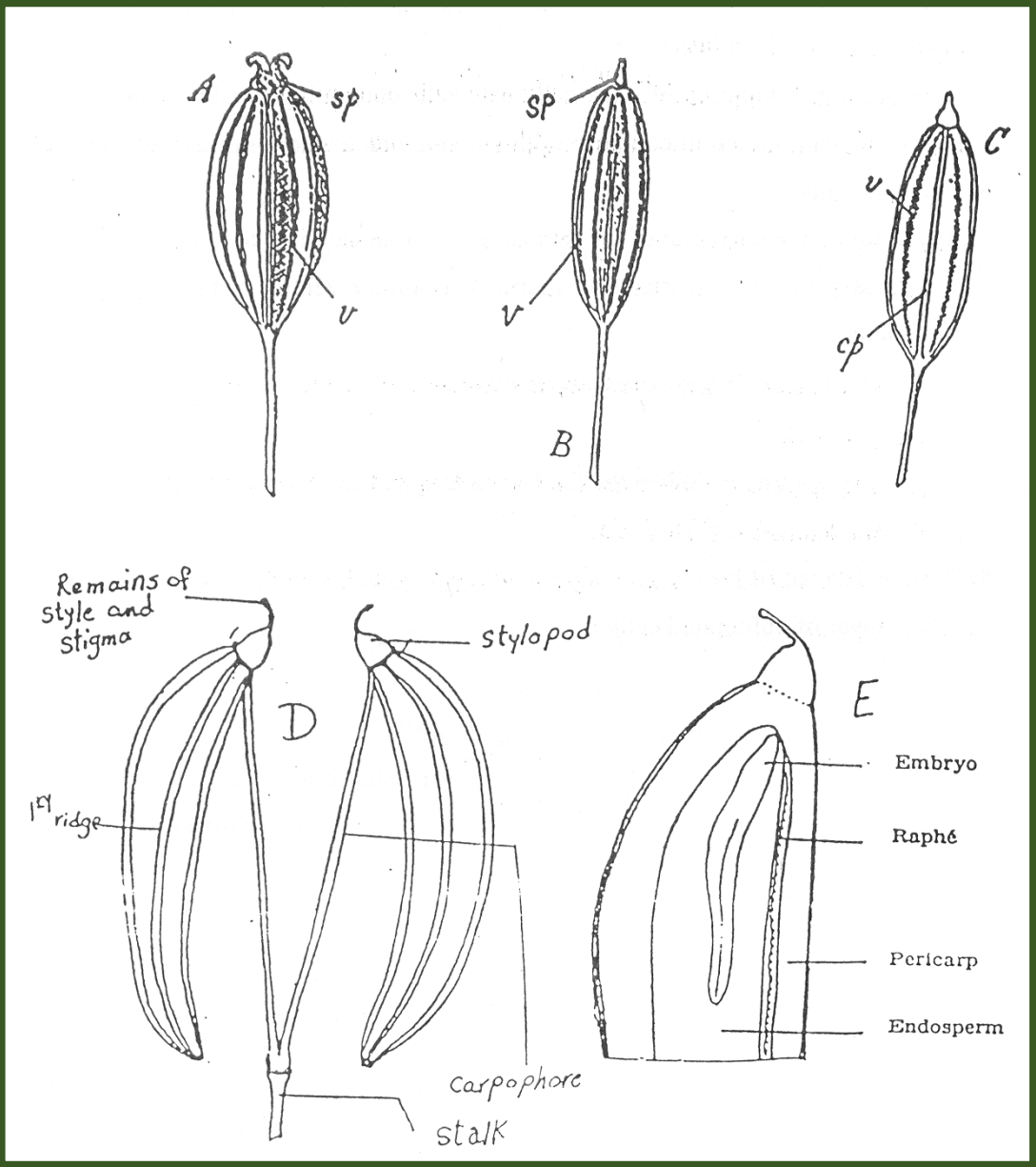


1) The fruit is true, simple,
dry,
schizocarpic,
cremocarp
that splits
upon drying
into two
indehiscent
one seeded
mericarps.

2) The apex of
the fruit is
crowned with a
conical
structure
named
stylopod
(represents the
remains of the
style, stigma
and nectary
disc).

General characters of family
Umbellifereae

Morphology



General characters of family Umbellifereae

Morphology

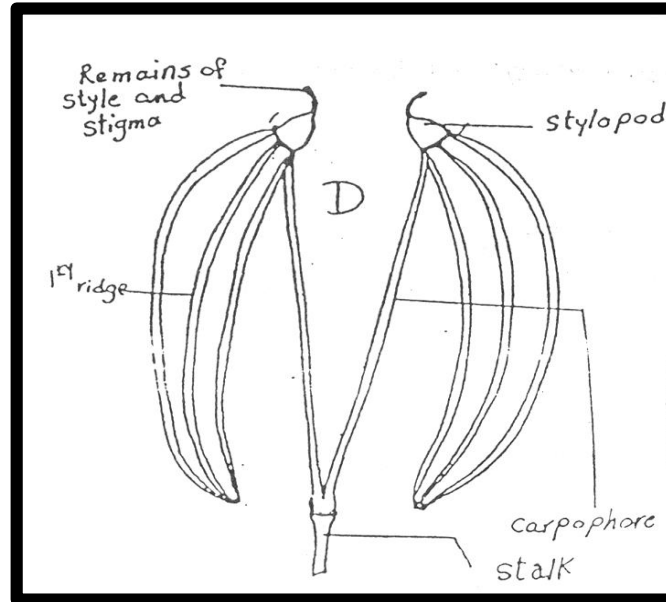


3) Surface of the cremocarp is characterized by the presence of 10 primary ridges(5 on each mericarp) over the vascular bundles & 8 secondary ridges over the vittae

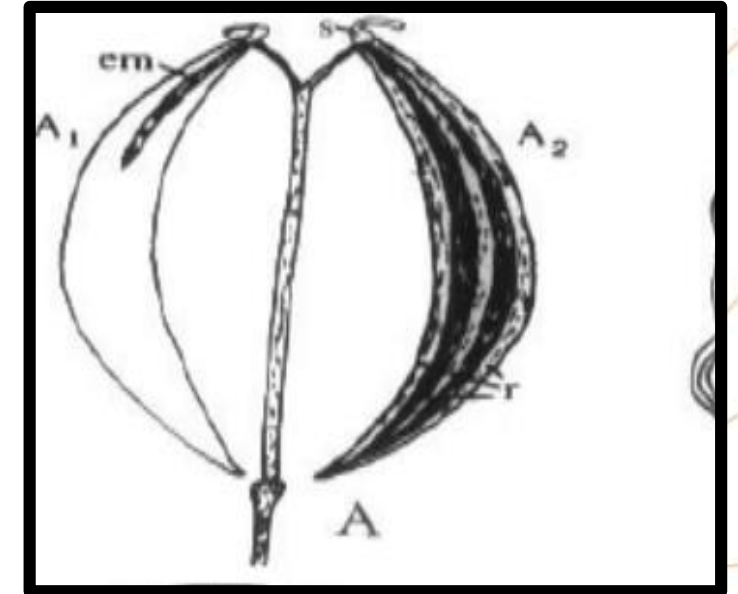
General Characters of Umbelliferous Fruits (Apiaceae)

4) Carpophore is a minute thread lies between the two mericarps.

It is an elongation of the receptacle between the carpels



Forked carpophore



simple carpophore

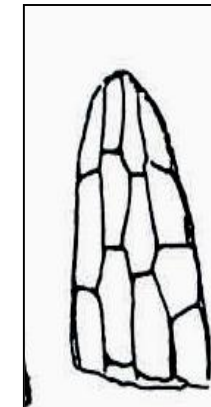
**General characters of family
Umbellifereae**

Histology



1) Epicarp is usually one row (epidermis)

2) Glandular trichomes are rare, while non-glandular trichomes occur as unicellular to multicellular having a shaggy form



General characters of family
Umbellifereae

Histology



3) The fruits are characterized by the presence of schizogenous secreting ducts (vittae) in the mesocarp, containing volatile oil or bitter principles; they are six in number in each mericarp.

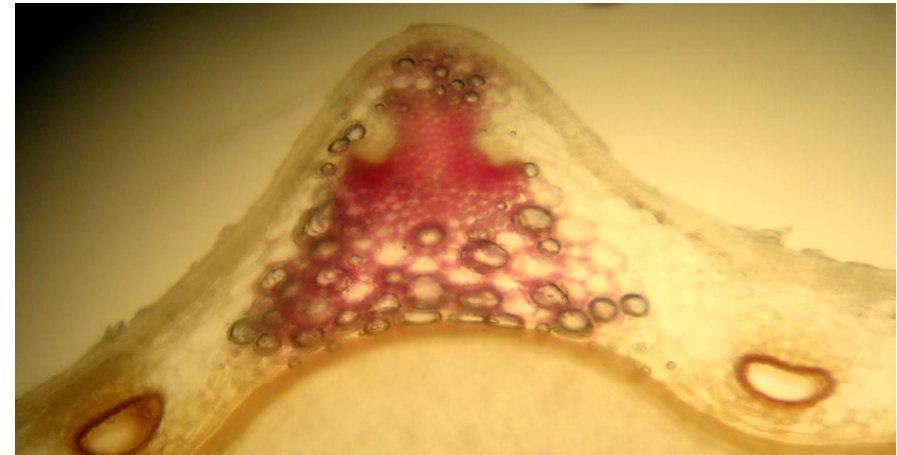


General characters of family
Umbellifereae

Histology



4) The vascular bundle is bicollateral fibro-vascular bundle and sometimes accompanied by reticulate parenchyma cells. They are five in number in each mericarp and located in the mesocarp in primary ridges.



**General characters of family
Umbelliferae**

Histology



5) The endocarp is composed of one row of narrow elongated cells. It appears in surface view as parallel cells, arranged in groups, either in parquetry or non parquetry manner.



***Fruit Example
Ammi visnaga & Ammi
majus***



Ammi visnaga

Ammi visnaga

Origin: The dried ripe fruit of
***Ammi visnaga* Lam.**
F. Umbelliferae (Apiaceae).



Ammi majus

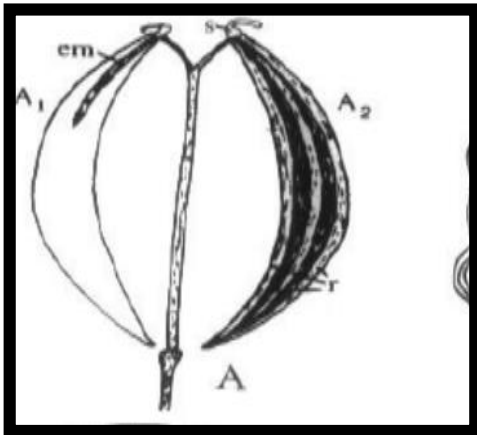
**Origin: The dried ripe fruit of *Ammi majus* Lam.
F. Umbelliferae (Apiaceae).**



Ammi visnaga

Violet tinge

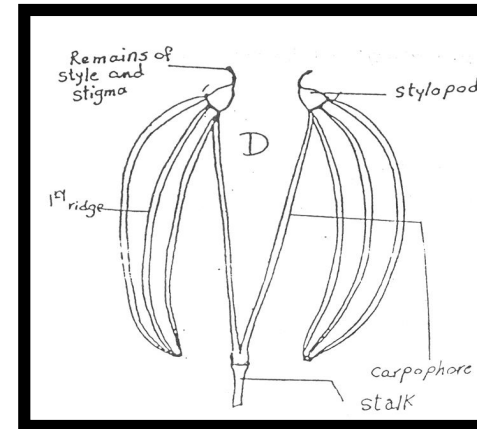
Simple Carpophore



Ammi majus

NO Violet tinge

Forked Carpophore



Morphology

Ammi visnaga

Crescent shaped Vascular bundle

Porous inner most layer of mesocarp

Ammi majus

Oval Vascular bundle

Non-Porous inner layer of mesocarp

Histology

Ammi visnaga

**Bitter principles: Khellin,
visnagin and visnadin**

Flavonoids: quercetin

Essential oil containing α -
terpineol and linalool

Fixed oil & protein

Ammi majus

**Bitter principles: Psoralene
and Ammidin**

Fixed oil & protein

Active constituents

Ammi visnaga

Spasmolytic especially on the muscles of the bronchi, GIT, biliary tract, urogenital system, and coronary vessels

1- Whooping cough It is now given for bronchial asthma and is safe even for children

2- Cramp-like conditions of **GIT**, **biliary colic**, and **painful menstruation**.

Uses

Ammi majus

Psoralene stimulates pigment production in skin exposed to UV light.

It is used externally as liniments and lotions for treating vitiligo, alopecia, and psoriasis.



Ammi visnaga

3- It is used for the removal of **gall bladder** and **kidney stones** by relaxing the muscles of the ureter.

4- The drug relaxes the **coronary arteries**, helps to improve the blood supply to the heart muscle, and thereby eases **angina pectoris**.

Uses

Ammi majus



Ammi visnaga

In **pregnancy** due to **uterine stimulating** activity of khellin.

Photodermatitis in sensitive individuals

Prolonged use may cause nausea, constipation, lack of appetite, headache, allergic symptoms (itching) and sleeplessness

Ammi majus

Photodermatitis in sensitive individuals

Contraindications and side effects

Ammi visnaga

Ammi visnaga boiled in **water**
then add **NaOH** → **Rose red**
colour

Ammi majus

Ammi majus boiled in **water**
then add **NaOH** → **NO** **Rose**
red colour

The **alcoholic** extract of ***Ammi***
majus fruit gives a **blue**
fluorescence in ultraviolet light

Chemical test



Home work

- Suggest the types of the following fruits:
apple- peas- wheat-pear- senna- tomato- olive
- How can you differentiate between seeds & fruits morphologically
- How can you identify an umbelliferous fruit morphologically
- Mention the uses & contraindications of *Ammi visnaga* fruit
- Mention the uses & contraindications of *Ammi majus* fruit
- How can you test for *Ammi visnaga* & *Ammi majus*



Google notebook link:

<https://notebooklm.google.com/notebook/5b8c9885-3660-4f77-a955-b3a75113c313>

THANK
YOU!