



# MSA UNIVERSITY

جامعة أكتوبر للعلوم الحديثة والآداب

IN EGYPT SINCE 1996  
Established by Dr.Nawal El Degwi



# Pharmacognosy

## PHG112

**3** GOOD HEALTH  
AND WELL-BEING



**4** QUALITY  
EDUCATION



# Course Instructors

***Prof. Dr. Mahitab Helmi***

Professor of Pharmacognosy

[mahelmy@msa.edu.eg](mailto:mahelmy@msa.edu.eg)

***Dr. Ibrahim Ezz***

Lecturer of Pharmacognosy

[iezz@msa.edu.eg](mailto:iezz@msa.edu.eg)

***Dr. Passant Mohamed***

Lecturer of Pharmacognosy

[pabdelbaki@msa.edu.eg](mailto:pabdelbaki@msa.edu.eg)

**Office: G42**

# References

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



# 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.

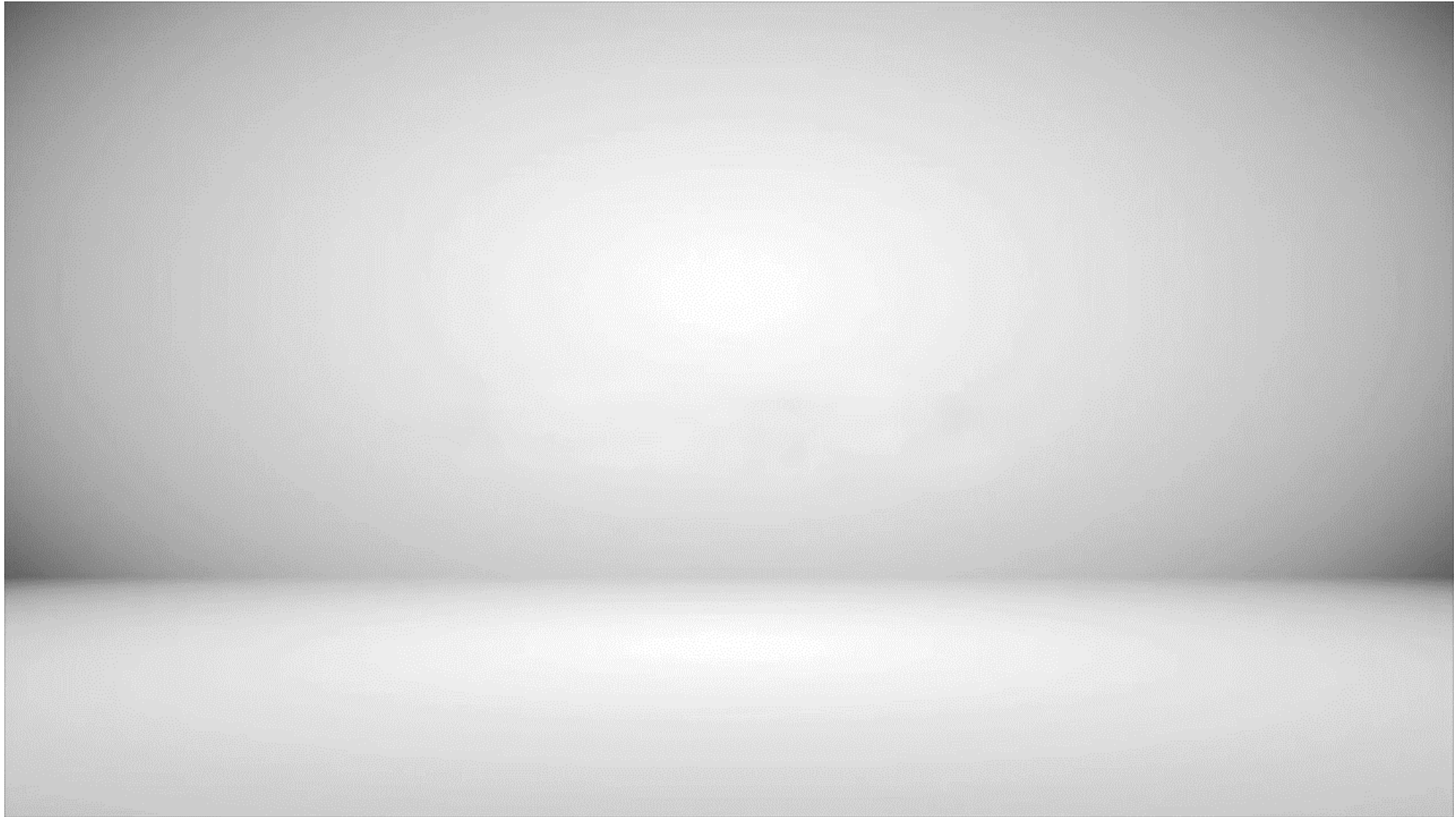
## 6. Evaluation

- **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.



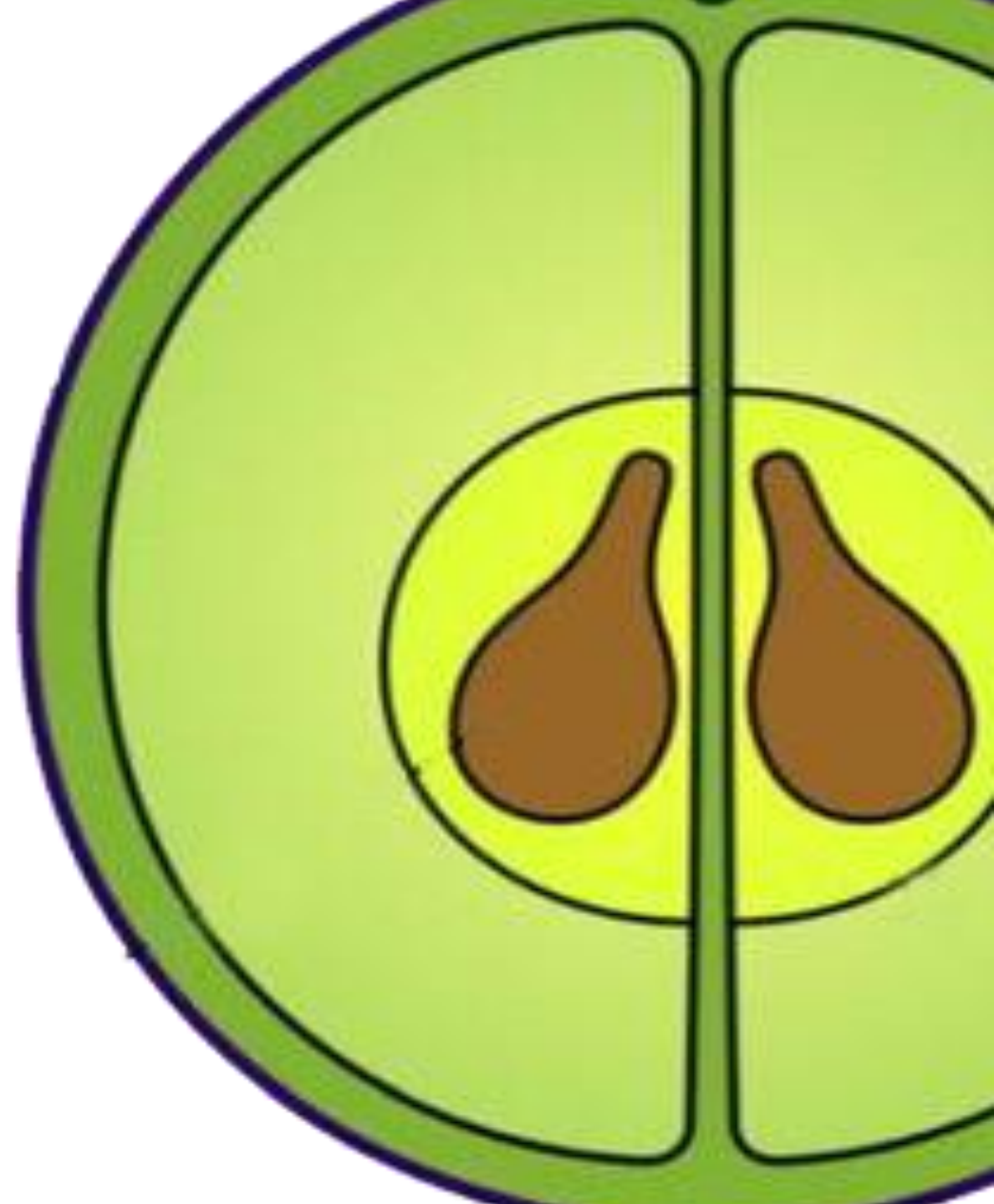
# *Introduction to Fruits*

# Fruit Formation

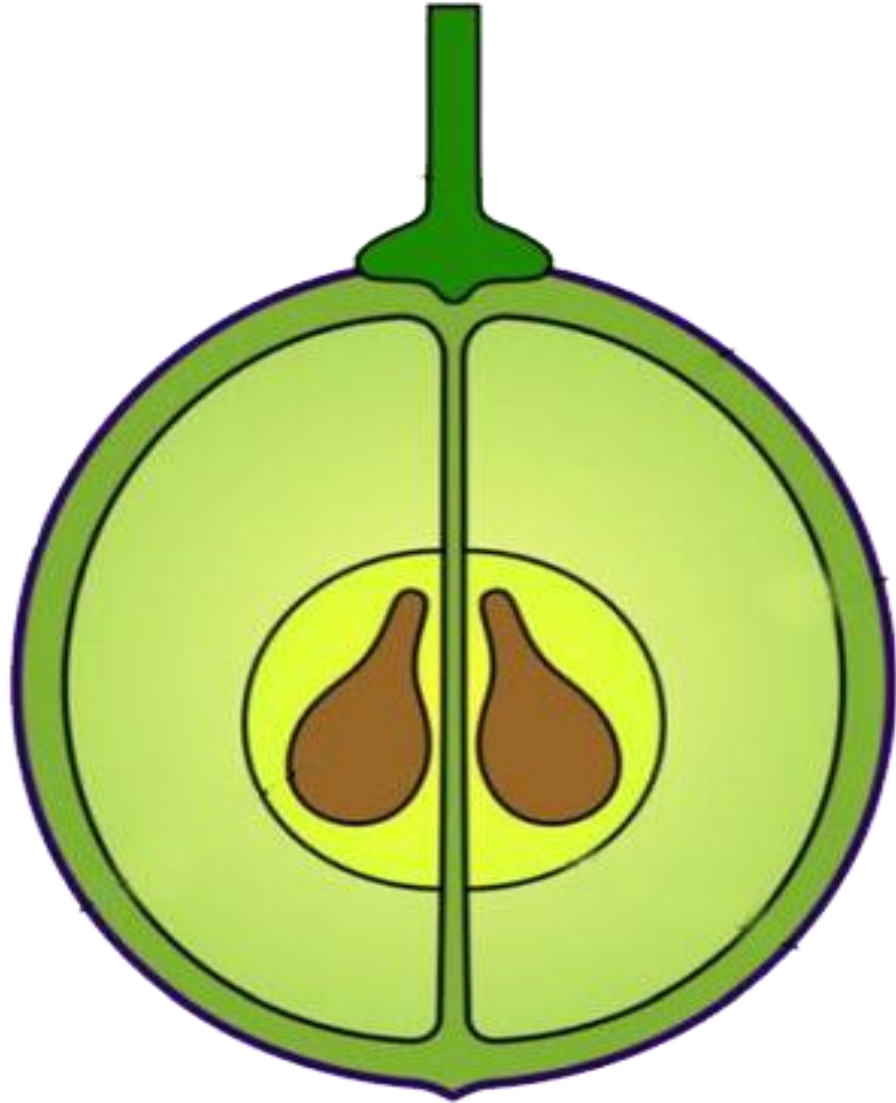


# The Fruit

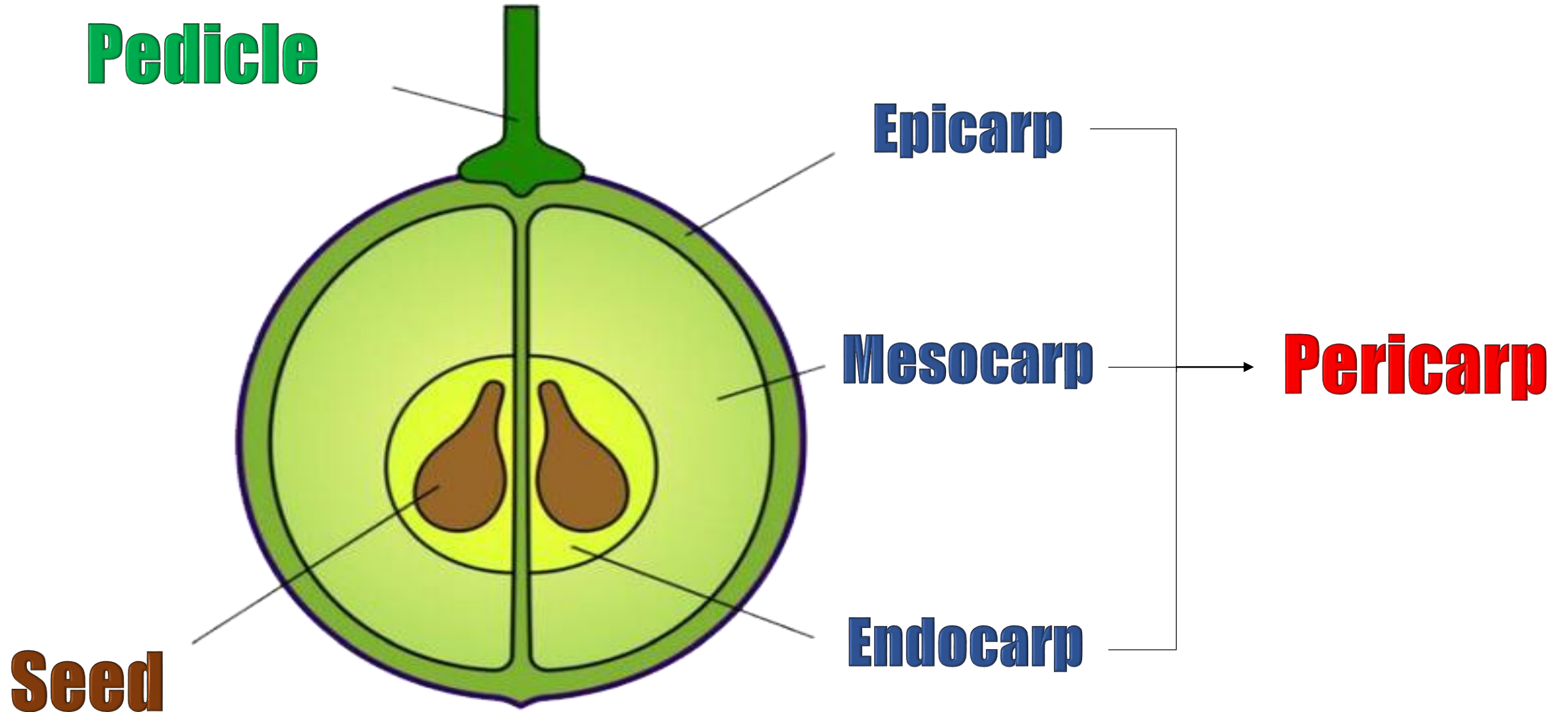
The whole product of the development of the **gynaecium** as a result of fertilization



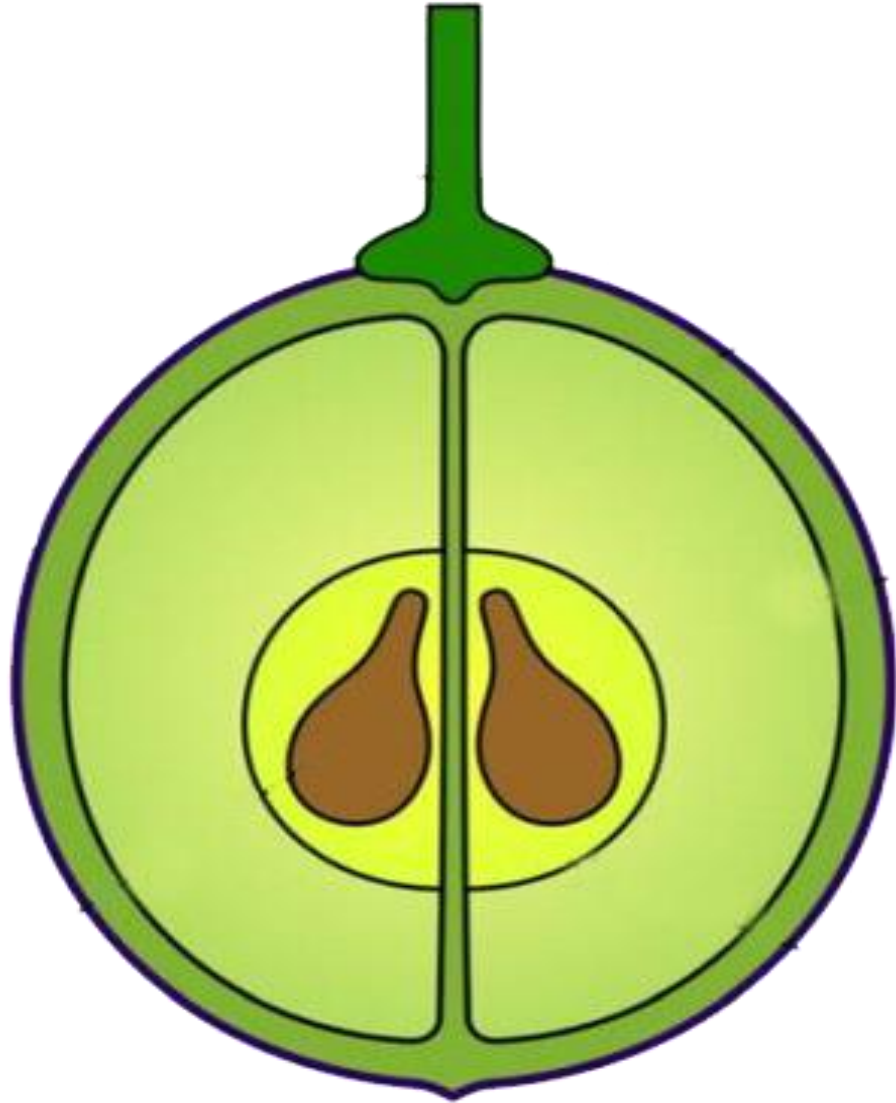
# Parts of the Fruit

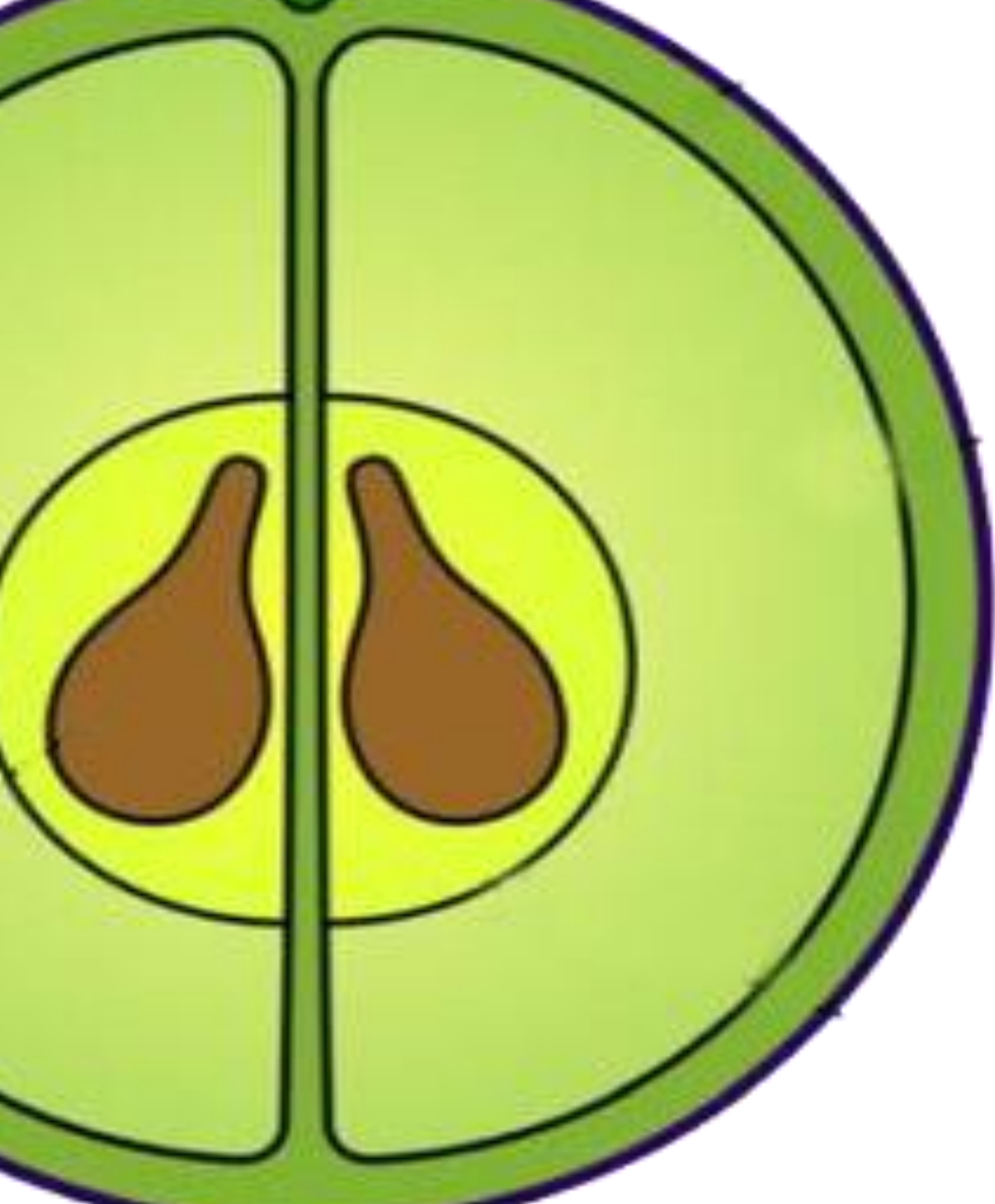


# Parts of the Fruit



# 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.



# Pericarp

**Dry**



**Wheat Grain**



**Cardamom**



**Nuts**

**Succulent**



**Capsicum**



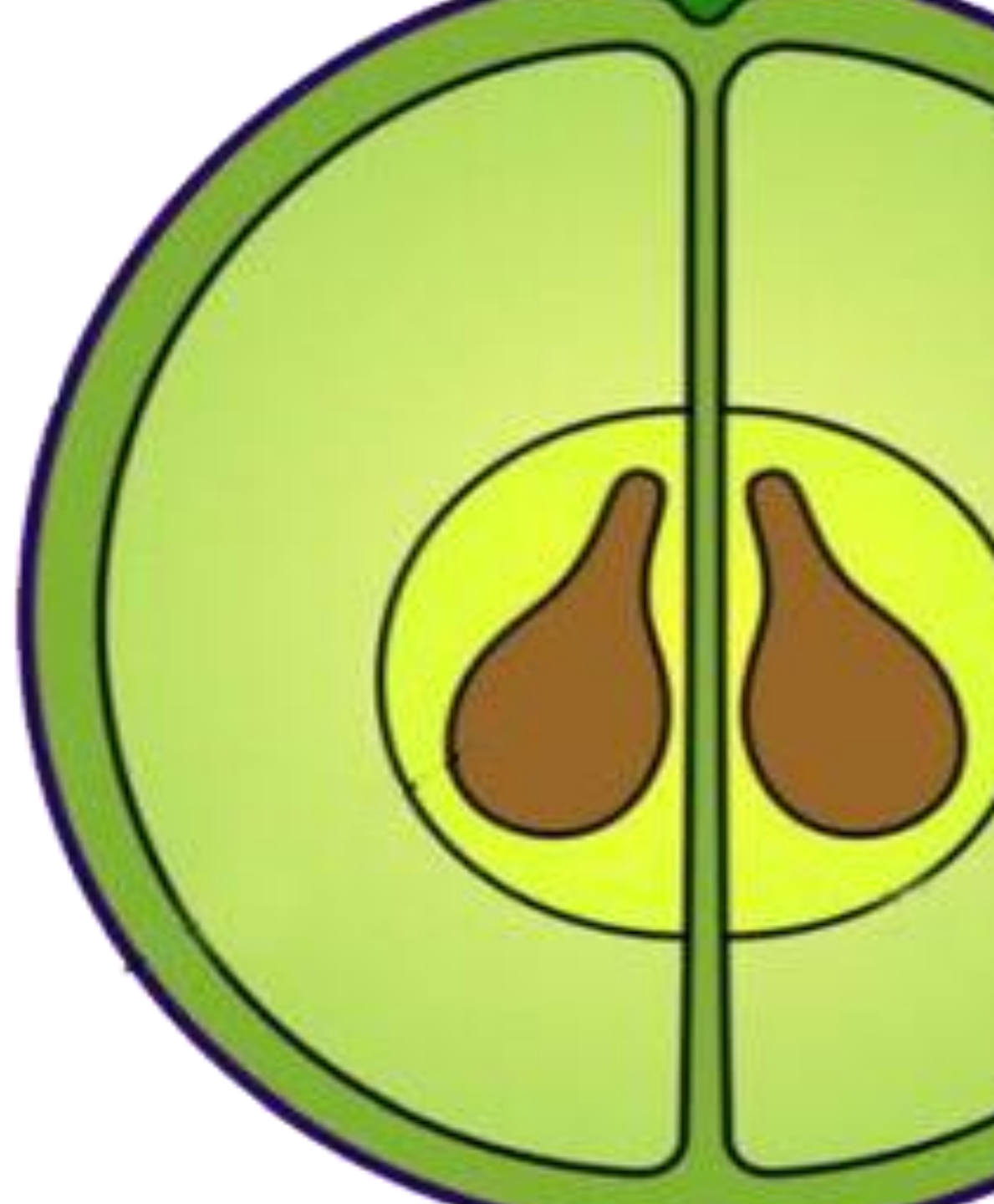
**Orange**



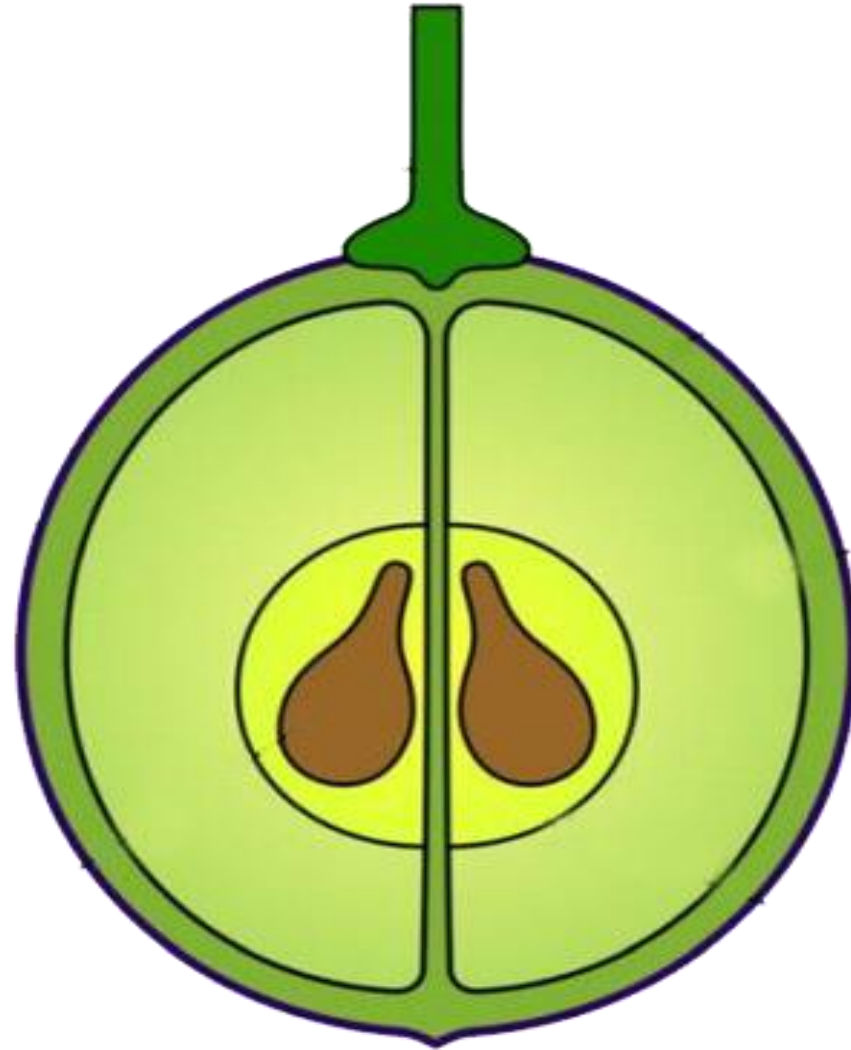
**Tomatoes**

# Seeds

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



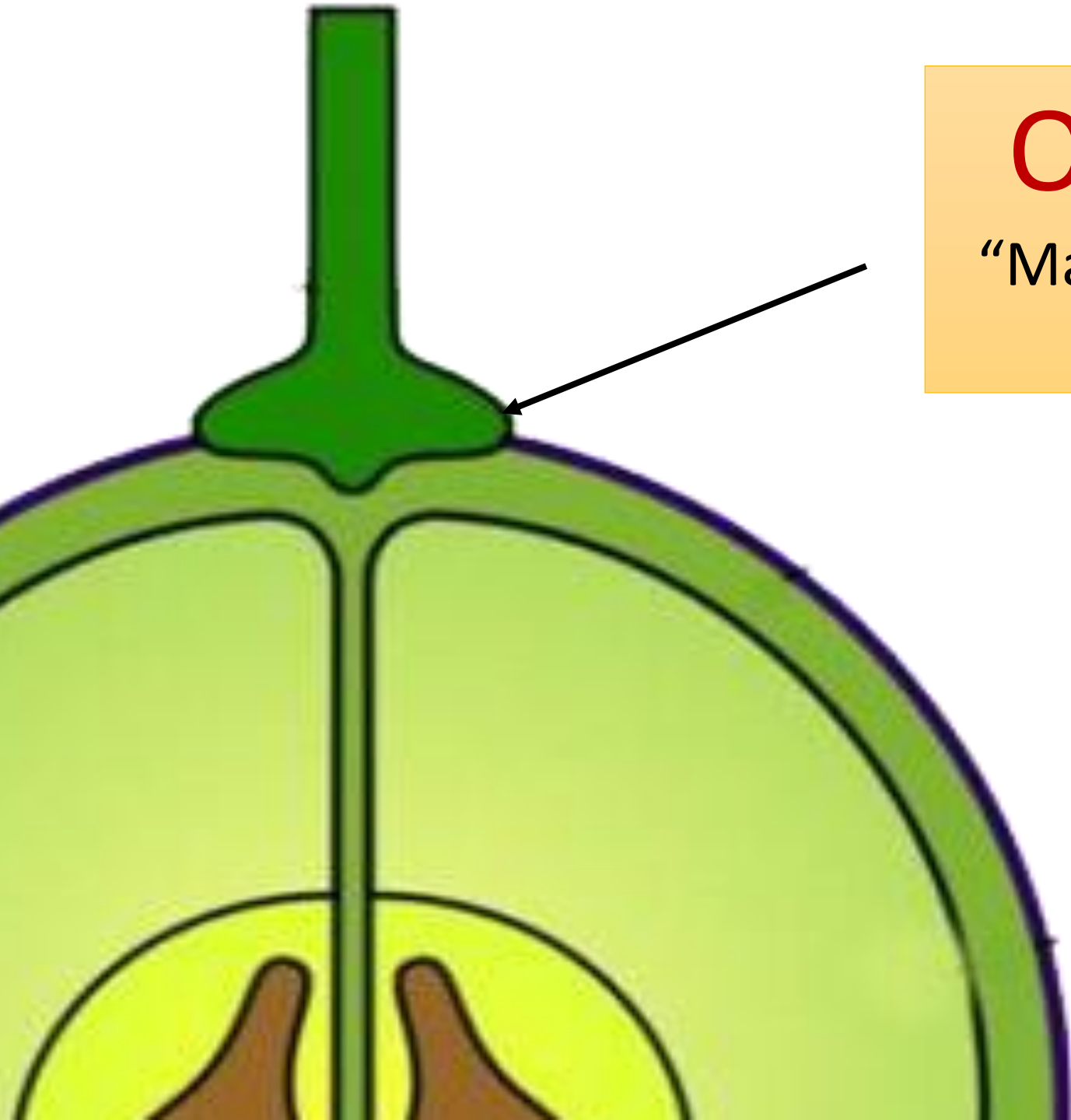
# Fruit Scars





## Apical and minute

“Marking the remains of style and stigma.”

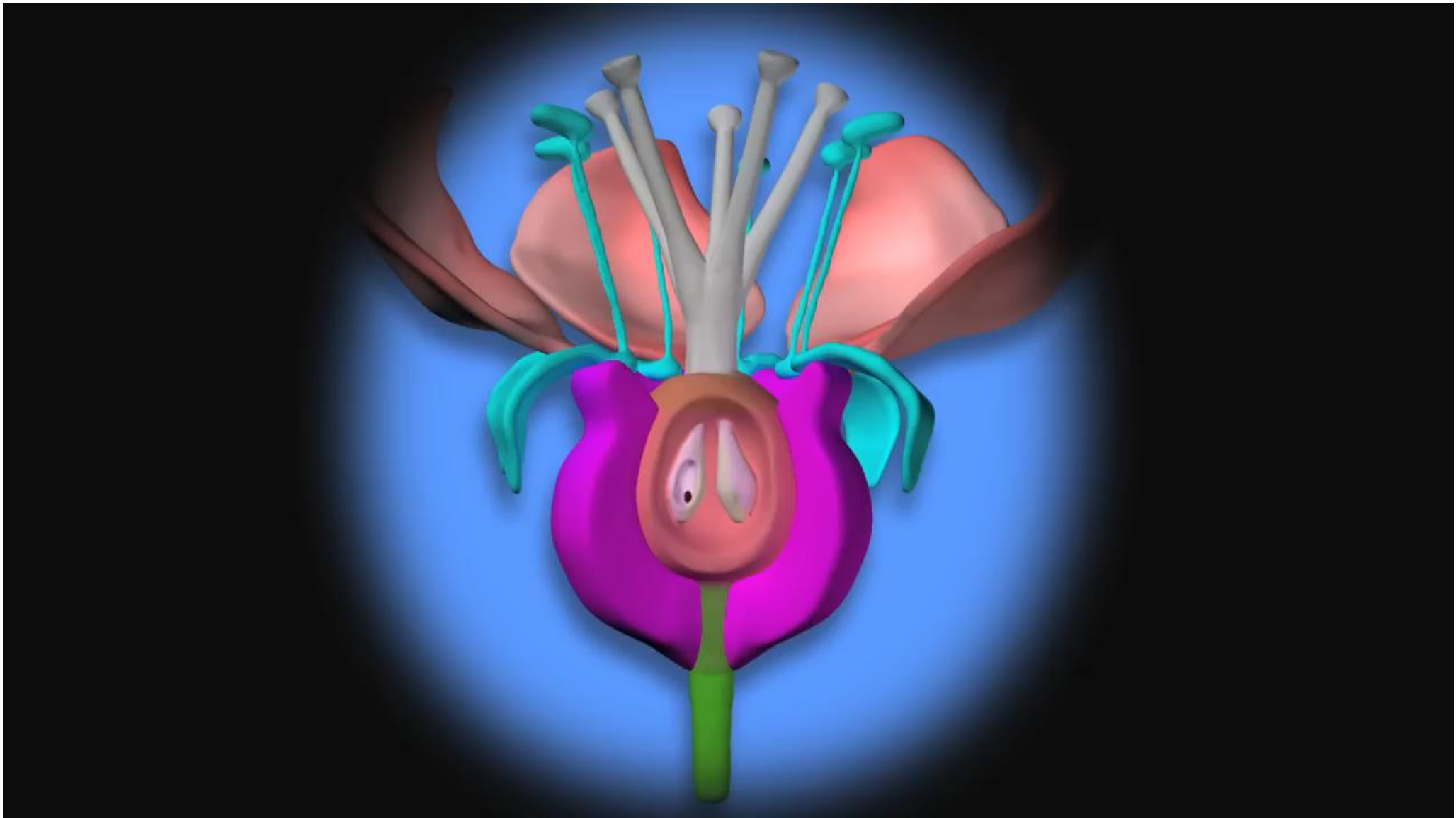


# One at the base

“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  
Umbelliferae**

**Morphology**

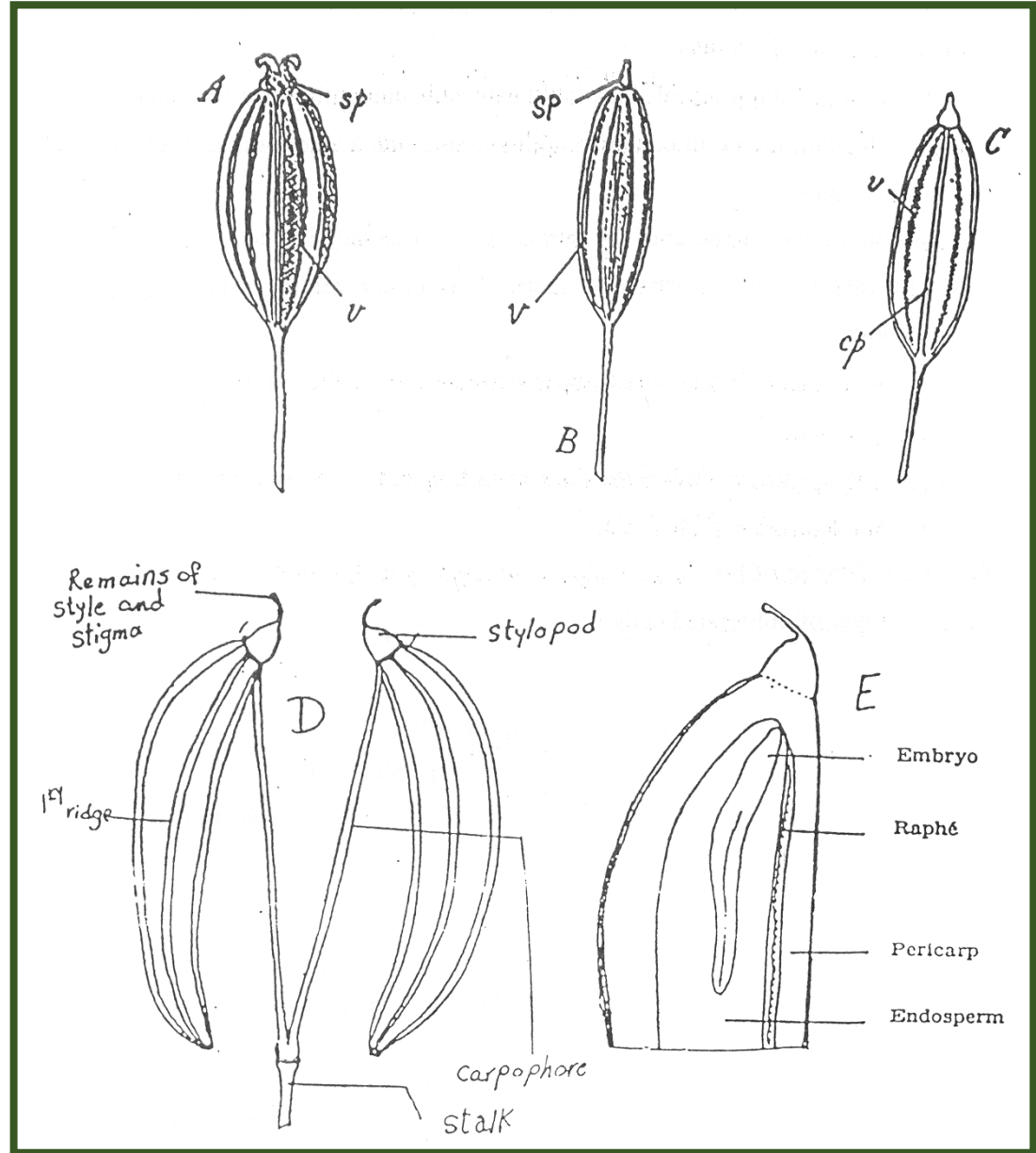


1) The fruit is true, simple, dry, schizocarpic, cremocarp that splits upon drying into two indehiscent one seeded mericarps.

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  
Umbelliferae**

**Morphology**

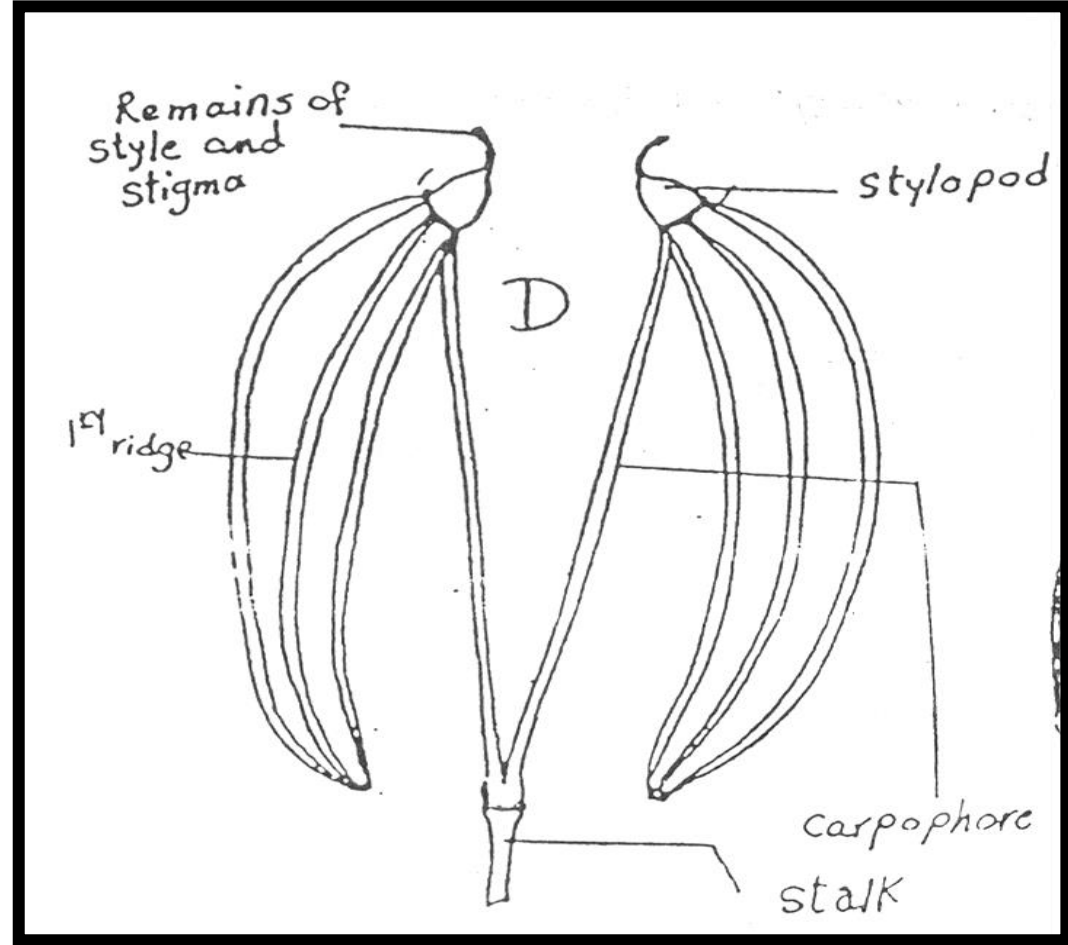


3) Surface of the cremocarp is characterized by the presence of 10 primary ridges(5 on each mericarp) over the vascular bundles & 8 secondary ridges over the vittae

4) Carpophore is a minute thread lies between the two mericarps.  
It is an elongation of the receptacle between the carpels

# General characters of family Umbellifereae

## Morphology



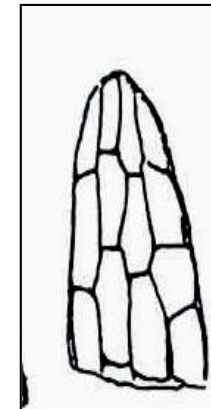
**General characters of family  
Umbellifereae**

**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.

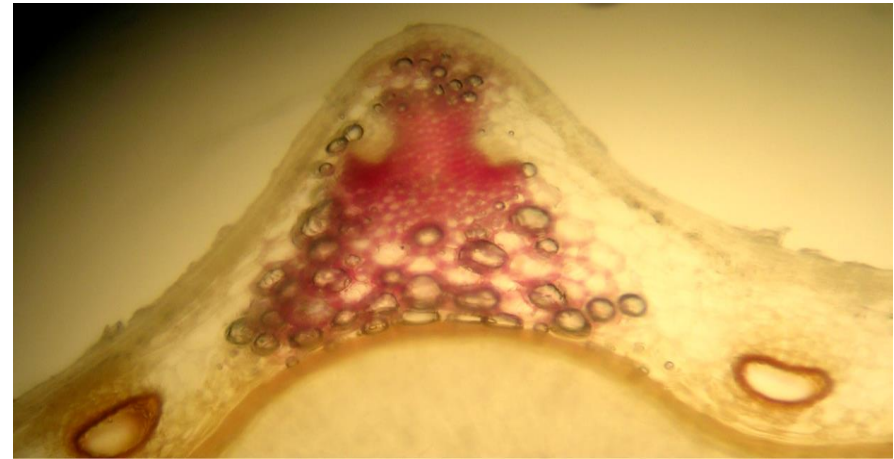


General characters of family  
Umbellifereae

# 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*

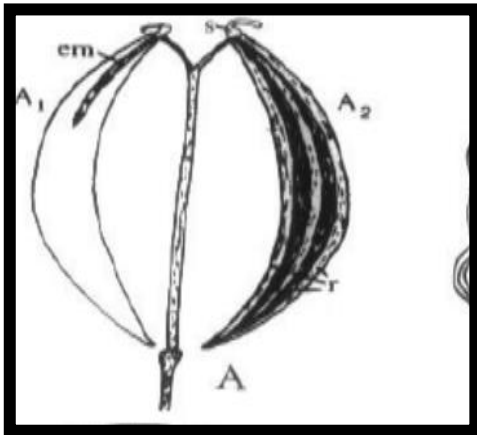
**Origin: The dried ripe fruit of *Ammi majus* Lam.  
F. Umbelliferae ( Apiaceae).**



# *Ammi visnaga*

**Violet** tinge

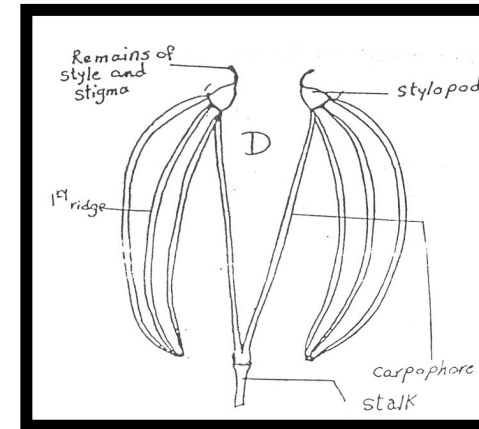
**Simple** Carpophore



# *Ammi majus*

**NO Violet** tinge

**Forked** Carpophore



**Morphology**

# ***Ammi visnaga***

**Crescent** shaped Vascular bundle

**Porous** inner most layer of mesocarp

**Finely** striated epicarp

# ***Ammi majus***

**Oval** Vascular bundle

**Non-Porous** inner layer of mesocarp

**Distinctly** striated epicarp

**Histology**

# ***Ammi visnaga***

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

**Flavonoids: quercetin**

**Essential oil containing  $\alpha$ -  
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**.

5- Can be used externally as ***Ammi majus***

# ***Ammi majus***

Uses



WWW.BUCKADAYPHARMACY.COM

# ***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**



## *Google notebook link:*

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



THANK  
YOU!