



MSA UNIVERSITY

جامعة أكتوبر للعلوم الحديثة والآداب

Pharmacognosy

PHG112

3 GOOD HEALTH
AND WELL-BEING



4 QUALITY
EDUCATION



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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
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Lecture 2

Examples of seeds

Interactive teaching methods and activities

QUIZIZZ



socrative

Video



https://www.youtube.com/results?search_query=linseeds

<https://www.youtube.com/watch?v=b7j2RMNtAYk>

<https://www.youtube.com/watch?v=bUjVHUf4d1I>

<https://www.youtube.com/watch?v=74A4yVggSjY>

Learning Outcomes

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

1. Knowledge / Remembering

- Identify the botanical sources and families of linseed, fœnugreek, strophanthus, and psyllium.
- List the main active constituents of each seed (fixed oils, mucilage, alkaloids, saponins, cardiac glycosides).
- Recognize the characteristic powder and microscopic features of each seed.
- Recall the principal therapeutic uses of each seed drug.

2. Comprehension / Understanding

- Explain the pharmacological basis of linseed and psyllium as bulk laxatives.
- Describe why linseed is considered non-toxic despite containing cyanogenic glycosides.
- Discuss the hypoglycemic and hypocholesterolemic effects of fenugreek.
- Summarize the cardiotonic action of strophanthus and how it differs from digitalis.

Learning Outcomes

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

3. Application

- Apply microscopic and powder characteristics to distinguish between different medicinal seeds.
- Use appropriate chemical tests to detect mucilage, fixed oils, proteins, saponins, or cyanogenic glycosides.
- Relate the chemical composition of each seed to its therapeutic action.

4. Analysis

- Differentiate between mucilage-containing seeds (linseed, psyllium, fenugreek) based on composition and mechanism of action.
- Analyze the role of cardiac glycosides in strophanthus and their clinical significance.
- Compare the contraindications and side effects of psyllium and linseed.

Learning Outcomes

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

5. Synthesis / Creating

- Construct a comparative table summarizing botanical source, active constituents, uses, and chemical tests of the seeds discussed.
- Propose a suitable herbal formulation for constipation, diabetes, or cardiovascular support using the studied seeds.

6. Evaluation

- Evaluate the safety considerations when using mucilage-containing seeds as laxatives.
- Assess the importance of chemical and microscopic tests in quality control of seed drugs.
- Judge the therapeutic value of seed-derived drugs in comparison to conventional pharmaceutical agents.



Examples of seeds *Linseed*

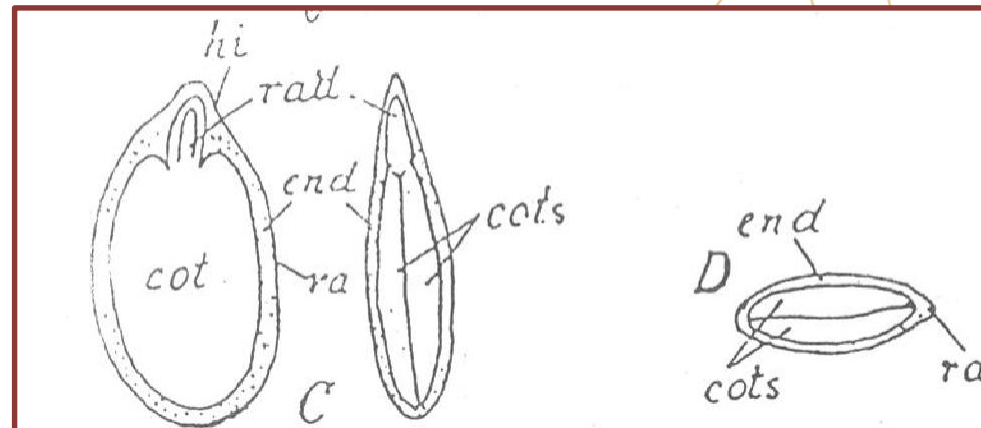
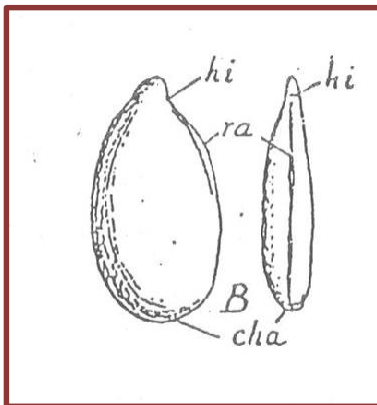
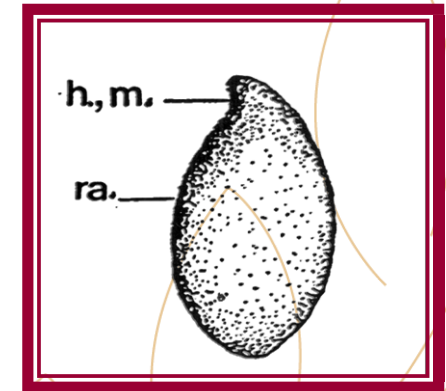
LINSEED

Flax Seed-Semen Lini



The dried ripe seeds of *Linum usitatissimum* Linne family Linaceae.

-Linseed yields not less than 30% of fixed oil

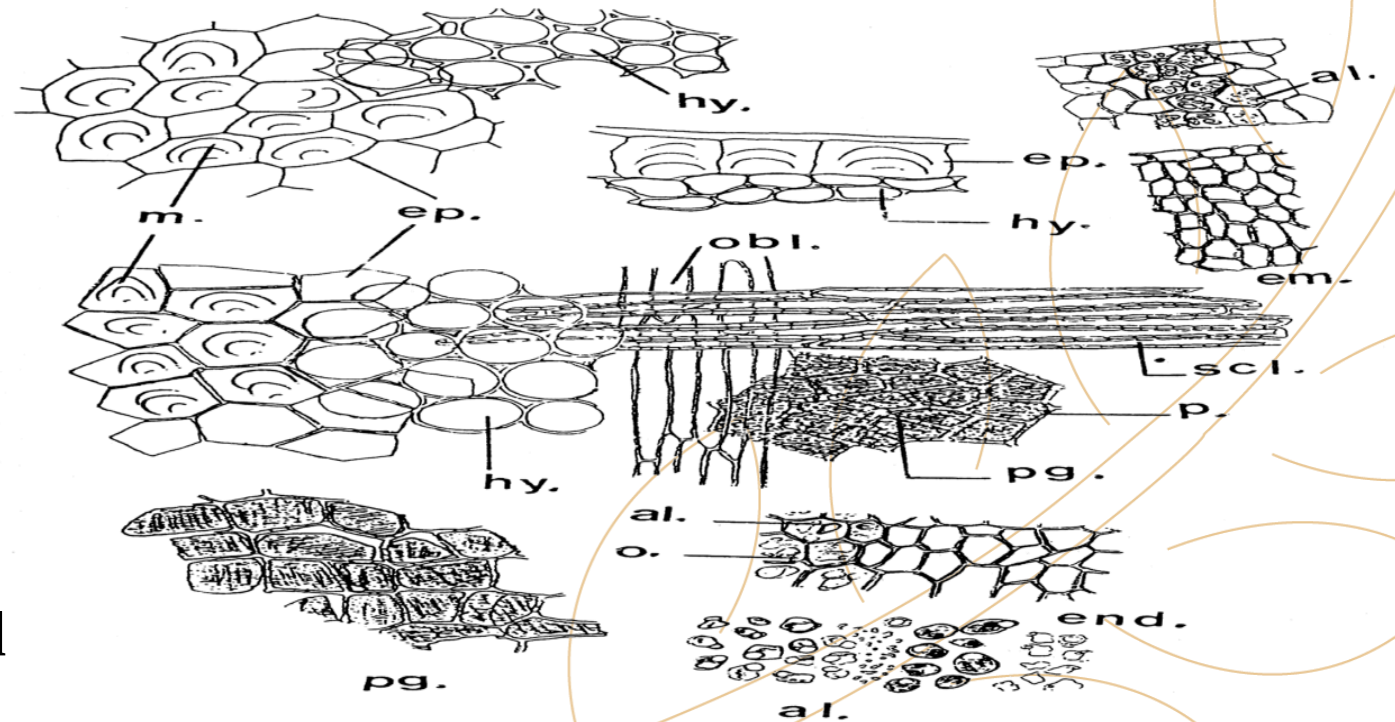


Powder

Colour: Yellowish-brown with readily reddish-brown fragments of the testa

Odour :It has a characteristic odor

Taste: Mucilaginous oily.



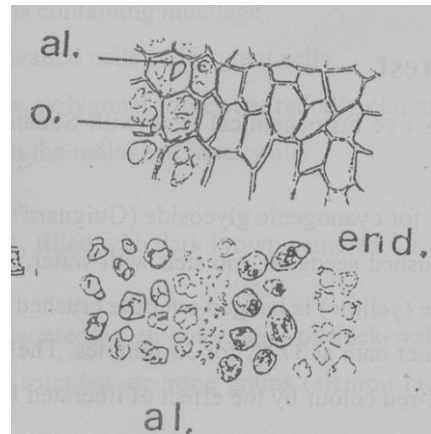
Powdered linseed

Microscopically, it is characterized by:

1.Dark brown fragments showing pigment cells (Polygonal flattened cells with pitted walls and reddish-brown contents)



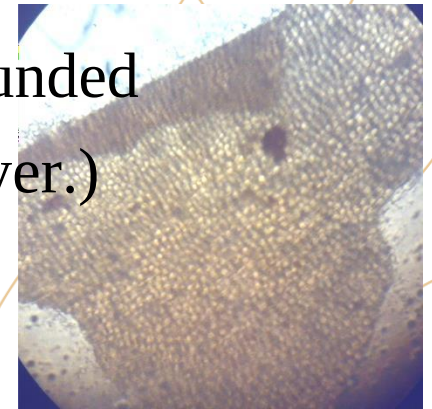
2.Fragments of the endosperm and cotyledons



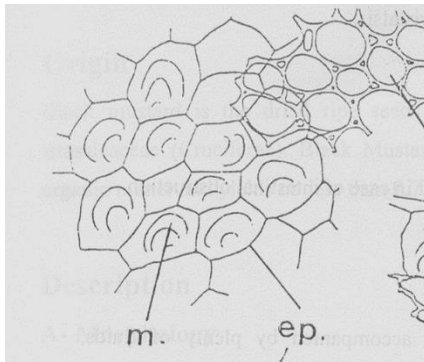
Endosperm

Microscopically, it is characterized by:

3. Mat-like structure: Fragments of yellowish-brown sclerenchymatous cells (appearing crossed by thin-walled elongated cells on one side and by rounded somewhat thickened parenchyma on the other and accompanied by pigment layer.)

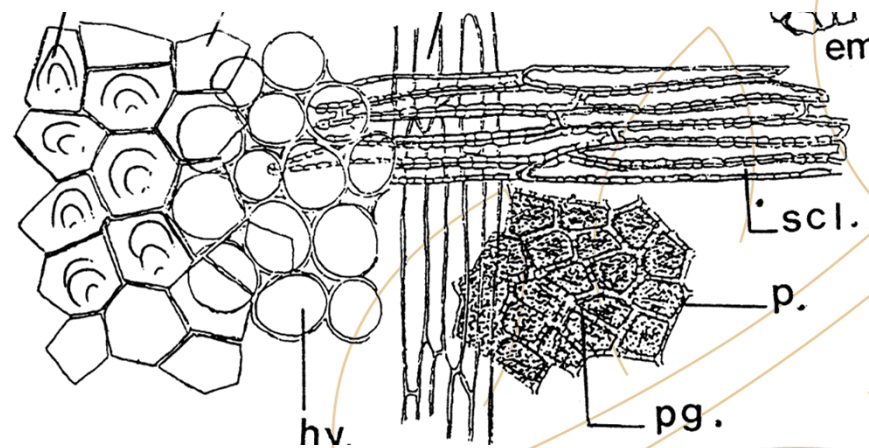


4. Mucilaginous epidermis.

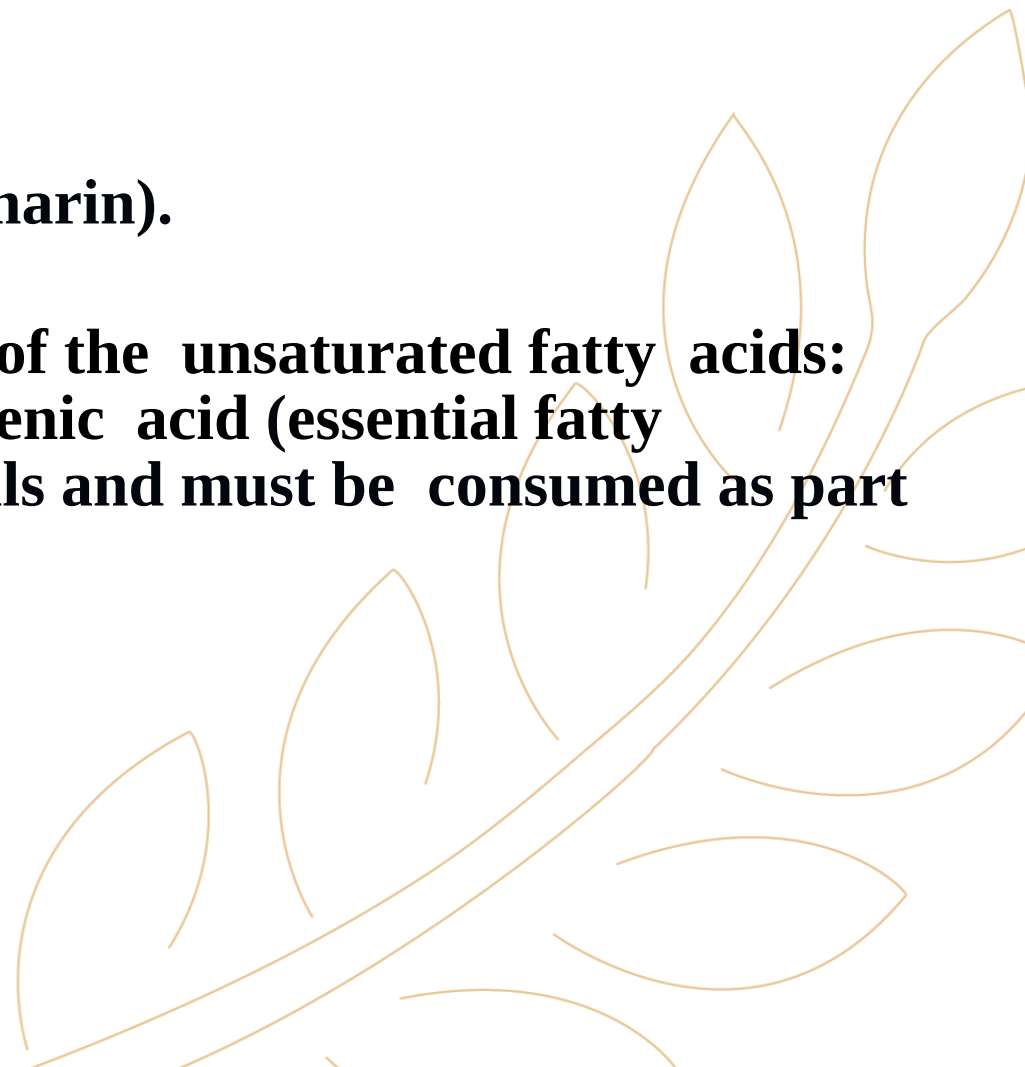


Epidermis with mucilage

Mat-like structure



Active Constituents



Small amount of a cyanogenic glycoside (linamarin).

30 to 40% of fixed oil containing high contents of the unsaturated fatty acids: oleic acid (39%), linoleic acid (15%) and α -linolenic acid (essential fatty acids that can not be manufactured by mammals and must be consumed as part of diet).

25% protein.

3-6% mucilage

Uses & Actions

Internally

1-Linseed is used in patients with rheumatoid arthritis and psoriasis.



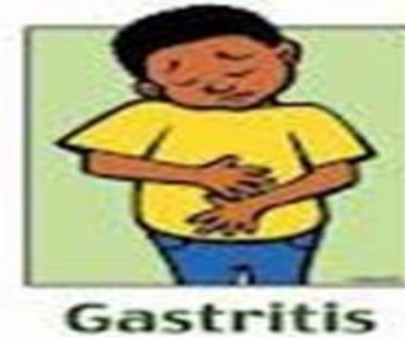
Rheumatoid arthritis



Psoriasis.

Uses & Actions

2-Demulcent in acute or chronic gastritis (mucilage)



3-Bulk laxative in habitual constipation, due to its mucilage & fixed oil which have a lubricant effect. The laxative action arises from an increase in the volume of the intestinal bowel contents and consequent reflex stimulation of peristalsis.



Uses & Actions

4-Anti-inflammatory (Omega-3 fatty acids have demonstrated effect due to reduced production of inflammatory mediators).



5- Heart protecting against angina pectoris, since Omega-3 fatty acids reduce the whole blood viscosity & lowers the cholesterol level.



Uses & Actions

Externally

Used as an emollient in poultices for boils, carbuncles and other skin infections.



Side effects

- **When taken internally, linseed must be accompanied by plenty of fluids, otherwise flatulence may occur.**

Contraindications

- **The drug is contraindicated in case of intestinal obstruction.**

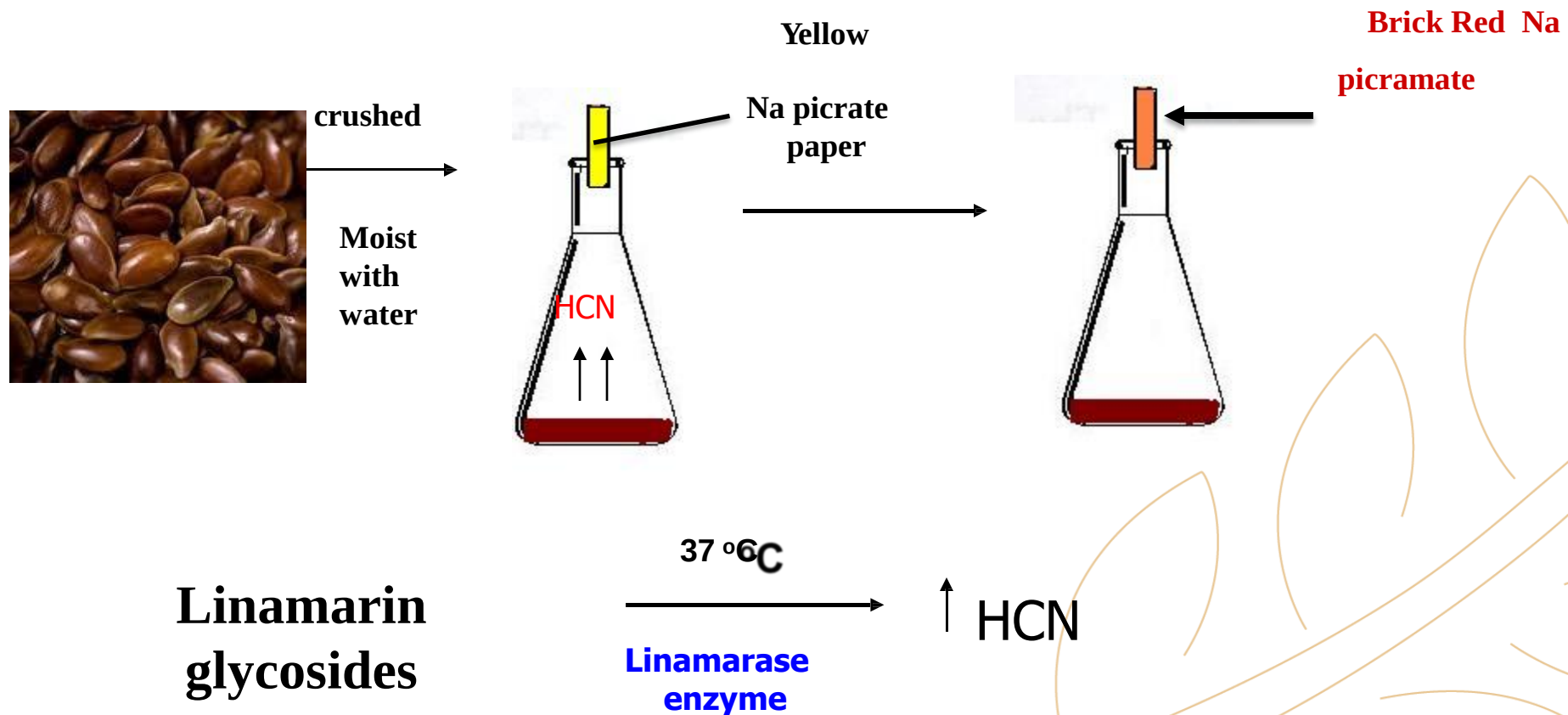
Why linseed is not toxic

Toxic effects arising from the liberation of HCN from the cyanogenic glycoside (linamarin) by the enzyme linamarase.

- 1 When crushed seeds are taken internally, linamarase is partly inactivated under the influence of the acidity of the stomach and less than 1% of the cyanogenic glycoside is hydrolyzed.**
- 2 Hydrolysis time of four hours is required *in vivo* system.**
- 3 The majority of HCN, liberated is converted rapidly into the relatively non toxic thiocyanate through a detoxification mechanism in the body.**
- 4 The minor part of HCN remained is eliminated via the urine and the feces.**

Chemical tests

1-General test for cyanogenic glycoside (Guignard's paper test):



Chemical tests (cont.)

2 Test for mucilage :

Red colour with Ruthenium Red

3 Test for fixed oil :

Red colour with sudan III

4 Test for proteins:

Red colour with Millon's reagent

Cosmeceutical Applications

-Use of linseed for hair

There are several ways to take care of your hair by using linseed:

-A mask: seeds are immersed for about 10 minutes, the mask should take the form of a jelly or gel

-Linseed oil is applied to the scalp and entire strands of hair.

It helps strengthen hair follicles, promote healthy hair growth, and reduce issues like hair breakage and thinning.

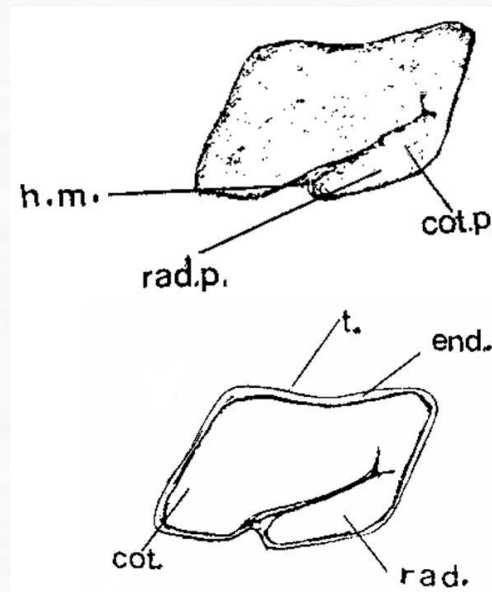




Fænugreek seed

Fænugreek Semen Fænugreek

- The dried ripe seeds of *Trigonella fænum-graecum* Linne Family Leguminosae.
- Contains not more than 2 % of foreign organic matter.
- Albuminous seed

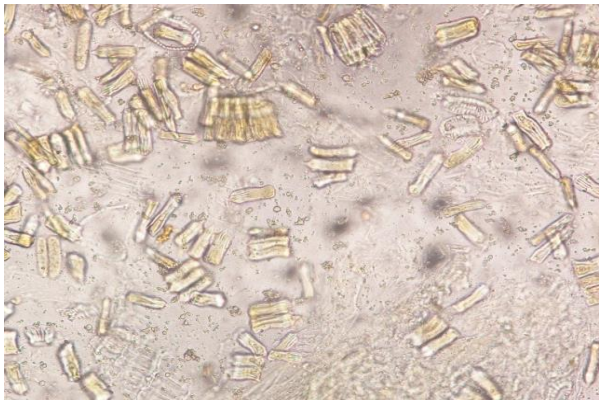


Powder

Yellowish in colour, with strong characteristic odour and a mucilaginous slightly bitter taste.

It is characterized by:

1. Fragments of testa showing the palisade like epidermal cells, the basket-like cells of the sub-epidermal layer.



palisade like epidermal cells

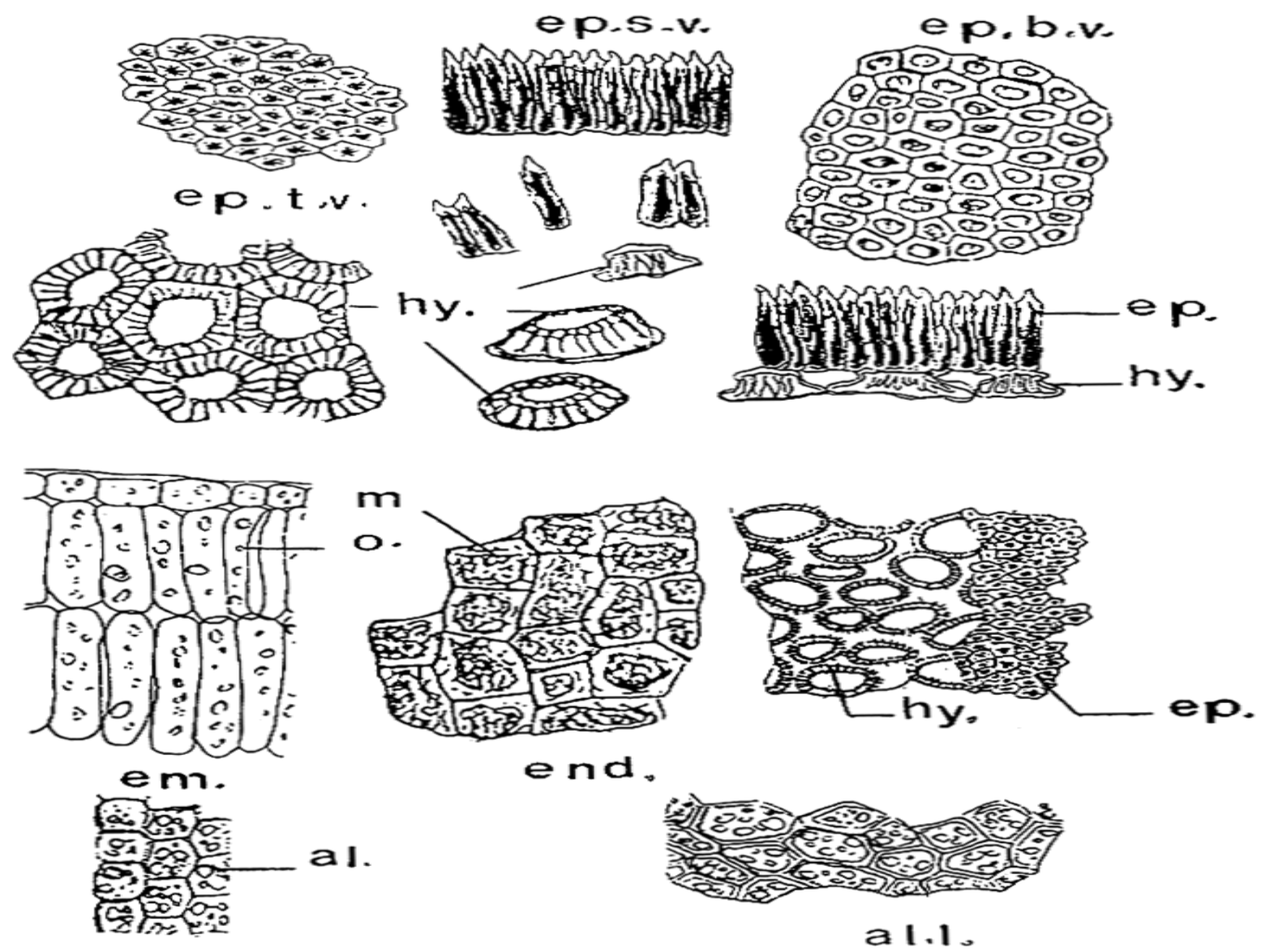


basket-like cells

2. Fragments of endosperm with mucilaginous cells.

3. Fragments of the cotyledons containing fixed oil and aleurone grains.

4. Very few small starch granules.



Active Constituents

28 % of
Mucilage

Alkaloids:
Gentianine
trigonelline &
choline

23-25% Proteins &
amino acids.

Flavonoids
Apigenin, luteolin,
vitexin & quercetin.

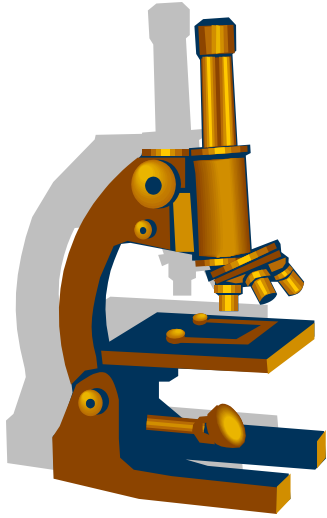
Saponins glycosides
Steroidal sapogenin,
0.6-1.7 % gitogenin,

Coumarin (5-8
%)

Vitamins
(nicotinic acid) &
minerals (a rich
source of
selenium).

Volatile
constituents
responsible for
the flavor of
Fœnugreek.

Chemical tests

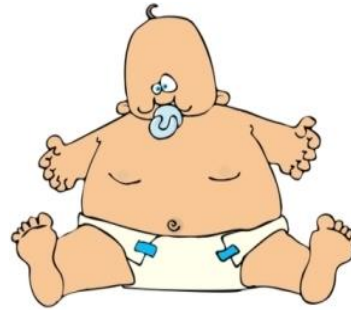


- It gives positive histochemical tests with sudan III and methylene blue
- Positive test for saponin (Froth test)

Medicinal Uses and actions

1-Hypoglycemic in diabetic patients.

2- Lactagogue.



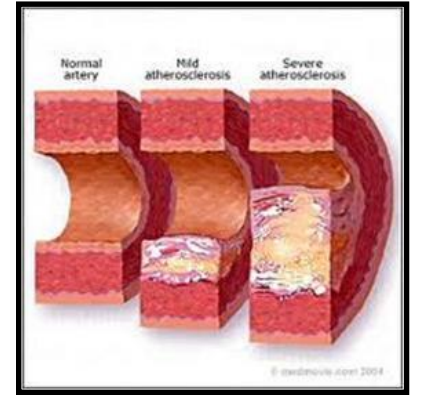
3-Treatment of dyspepsia & gastritis



Gastritis

Medicinal Uses and actions

4-Hypocholesterolemic actions in normal and diabetic humans.



atherosclerosis

5- It has demulcent, laxative and nutritive properties.

6-Topically for wounds , leg ulcers & to reduce inflammation



Side effects and/or toxicity

- **1-Repeated external applications can result in undesirable skin reactions.**
- **2-Minor gastrointestinal symptoms, such as diarrhea and flatulence.**

Contraindications

- **1-The hypoglycemic activity of fœnugreek may interfere with an existing hypoglycemic therapy.**
- **2-Oxytoxic and uterine stimulant activity ,the use of fœnugreek during pregnancy and lactation in doses greatly exceeding those normally encountered in foods is not advisable.**

Fœnugreek Preparation

Nutraceutical



Cosmeceutical



Cosmeceutical Applications

- It helps **strengthen hair follicles**, promote healthy hair growth, and reduce issues like hair breakage and thinning.
- **Skin rejuvenation**: Incorporate fenugreek oil into your skincare routine to revitalize and rejuvenate your skin.
- **Anti-collagenase** activity and increased collagen production anti-aging remedy
- It helps **moisturize**, soothe inflammation.



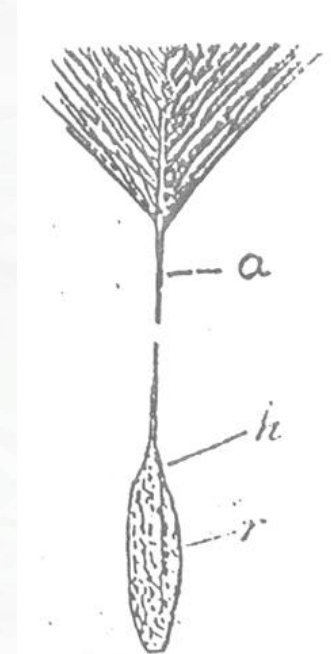


Strophanthus seed

Strophanthus Seed

Strophanthus is the dried ripe seeds of *Strophanthus kombe*, *S. hispidus* & *S. gratus*

Family Apocynaceae deprived of their awns.



Active Constituents

8 – 10% of a mixture of cardiac glycosides

K – strophanthin &

K - strophanthoside

**4 - 8 % of ouabain
(G - strophanthin)**

Kombic acid

Uses and actions

1- Cardiac stimulant and cardiogenic



2-It controls the blood pressure

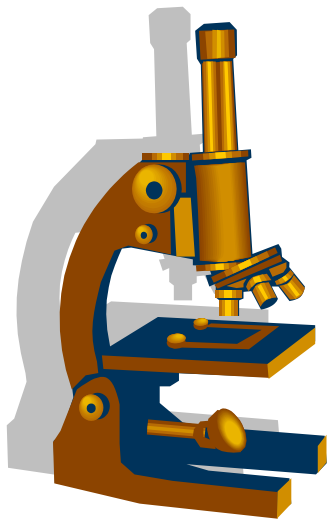


3- Efficient diuretic.

In certain cases, it is used as substituent for digitalis :

It is not cumulative and less liable than
digitalis to produce gastric& intestinal irritation.





Chemical test

Mount a section of Strophanthus in sulphuric acid (66 % v/v).

The endosperm acquires a **green** colour

The embryo acquires a **Green** in *S. kombe* or **Reddish brown** colour in *S. hispidus* (Strophanthin glycoside) or **Red** colour in *S. gratus* (Ouabain)

Effect of 66% sulphuric acid

	<i>S. Kombe</i>	<i>S. hispidus</i>	<i>S. gratus</i>
The endosperm	Green	Green	Green
The embryo	Green	Reddish brown	Red
The glycoside	K-strophanthin	H-strophanthin	Ouabain

HOME WORK



- 1- Enumerate scars on the surface of the seed
- 2-What is meant by: albuminous seed, exalbuminous seed, kernel
- 3-Complete the following statements:
 - a- Linseed is an example of.....seed
 - b- Linseed is not toxic because.....,,
 - c- Linseed is tested by.....
 - d- Active constituents in Linseed are,,.....
 - e- Linseed is used,,.....,
 - f- Foenugreek is an example of.....seed
 - g- Foenugreek is used for,,
 - h- Foenugreek is tested by.....
 - i- Active constituents in Foenugreek are,,.....



Google notebook link:

<https://notebooklm.google.com/notebook/96593c06-07ca-4d98-81f2-e03b066011c0?authuser=1>

THANK
YOU!