OCTOBER UNIVERISTY
FOR MODERN SCIENCES AND ARTS
جامعة أكتوبر للعلوم الحديثة والآداب

Pharmacogno

PHG 112
PG 102

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Spring 2024

Faculty of **Pharmacy**

October University For Modern Sciences and Arts - MSA-Faculty of Pharmacy

Vision

The Faculty of Pharmacy of October University for Modern Sciences and Arts is a pioneer in tutelage, scientific research, and community service at the local and regional levels, and holds an advanced position among its counterparts in international Pharmacy subject ranking

كلية الصيدلة جامعة اكتوبر للعلوم الحديثة و الآداب (MSA) كلية رائدة فى مجال التعليم و البحث العلمى و المشاركة المجتمعية على المستوى القومى و الإقليمى و لها ترتيب متقدم فى التصنيف العالمى لكليات الصيدلة.

Mission

• **The Faculty of Pharmacy of October University for Modern Sciences and Arts is nationally accredited, has British partnership, and is committed to producing graduates who are able to compete in national and international job markets and entrepreneurship, and to be an effective member of the medical team providing best medical care, while heeding professional ethics, through an outstanding academic programme and proficient academic staff. The faculty is devoted also to provide effective community services, and exceptional applied scientific research.**

رسالة الكلية:

كلية الصيدلة جامعة أكتوبر للعلوم الحديثة والآداب معتمدة محليا، بشراكة بريطانية، تلتزم بتخريج صيدلى قادر على المنافسة فى أسواق العمل المحلية و الدولية و ريادة الأعمال، و أن يكون عضو فعال فى الفريق الطبى بتقديم أفضل رعاية صحية، مراعياً أخلاقيات المهنة، من خلال برنامج تعليمى متميز و أعضاء هيئة تدريس أكفاء، وكذلك تلتزم الكليه بتقديم خدمات مجتمعية فعالة و أبحاث علمية تطبيقية متميزة.

Pharmacognosy

PHG 112
PG 102

AIM OF THE COURSE

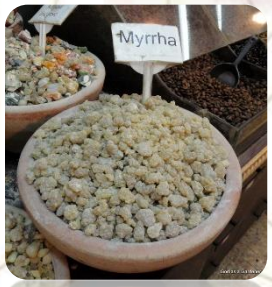
The course introduces the student to the knowledge and skills that enable him to differentiate between different organs of crude drugs through their monographs (seeds, fruits, herbs, subterranean organs, unorganized drugs in addition to drugs of marine and animal origin) , identifying their active constituents and adulterants, description of micro- and macro-morphological characteristics, benefits and precautions of their medicinal uses, side effects and contraindications and to have an overview over their phytopharmaceuticals available on the market specially the Egyptian market.

Weighting of assessments

Item	PG 102	PG112
Quizzes:	5 Marks	5 Marks
Assignments:	10 Marks	15 Marks
Practical Exam(s)	20 Marks	40 Marks
Mid Term Exam	15 Marks	30 Marks
Final Exam	35 Marks	60 Marks
Oral Exam	15 Marks	----------
TOTAL	100 Marks	150 Marks

Course Content

- Seeds
- Fruits
- Herbs
- Subterranean organs
- Unorganised drugs



REFERENCES

1. Trease& Evans' Pharmacognosy by William Charles Evans, 2002.
2. Botany : An introduction to Plant Biology, Third edditionby James D. Mauseth,2008
3. Fundamentals of Pharmacognosy and Phytotherapy by Michael Heinrich, Joanne Barnes, Simon Gibbons, and Elizabeth M. Williamson, 2004

Electronic Materials, Web Sites

http://www.hort.purdue.edu/newcrop/med-aro/default.html
http://www.herbmed.org/
http://www.danish-schnapps-recipes.com/plants.html
http://www.botanical.com/

Lecture 1

Interactive teaching methods & activities

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

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

https://www.youtube.com/results?search_query=linseeds
https://www.youtube.com/watch?v=b7j2RMNtAYk

Quizizz

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

- **- Nutraceuticals &Cosmeceuticals**
- **-Definition of seed & its function**
- **- Different layers in the seed**
- **- Different types of seeds**
- **- Example of official seed**

I- Linseed

- **The morphological & microscopical structure of linseed**
- **-The chemical constituents & uses of linseed**

Nutraceuticals &Cosmeceuticals

Nutraceuticals

“ LET FOOD BE YOUR MEDICINE ”

Hippocrates

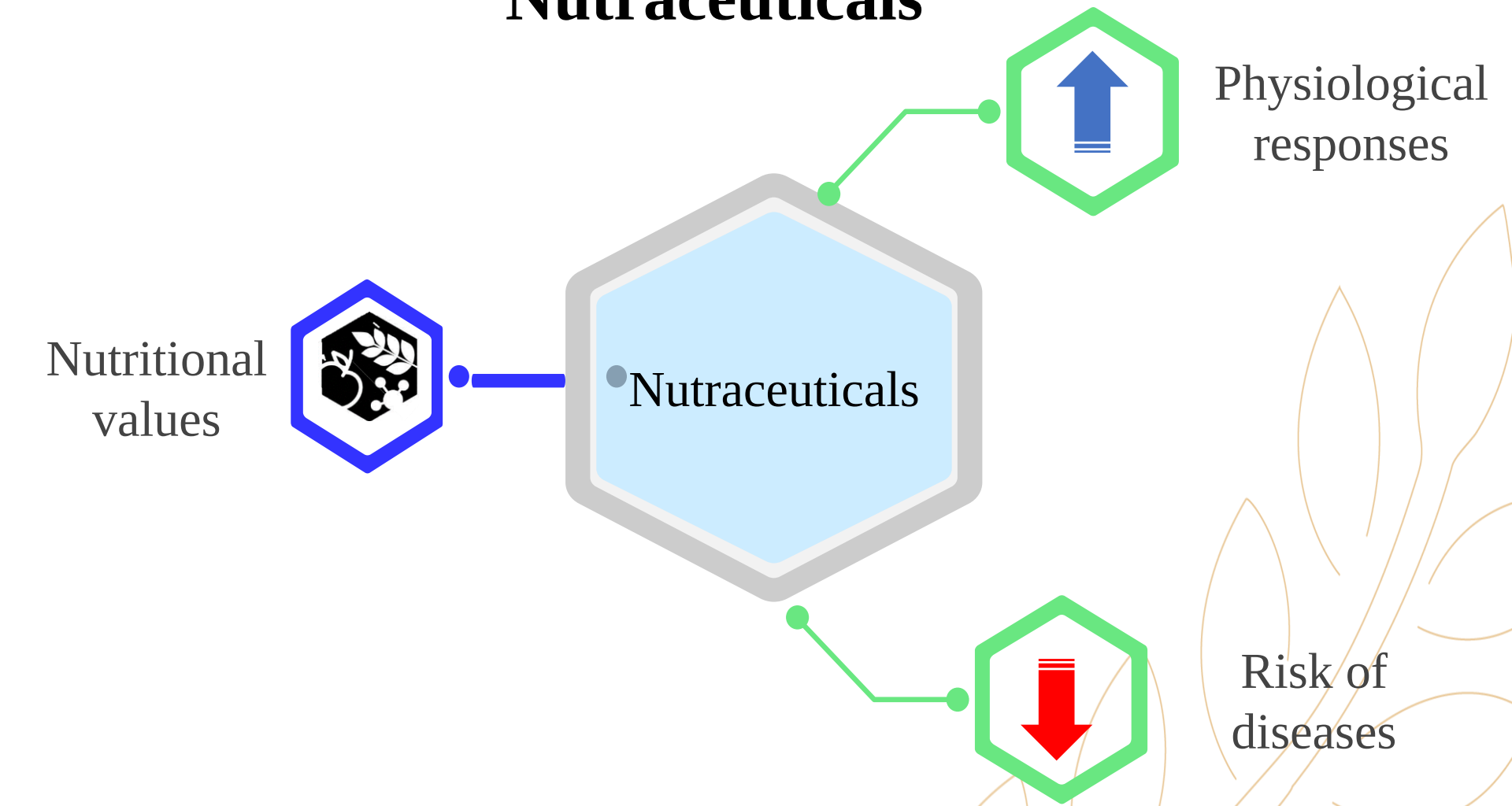
What is meant by Nutraceuticals

- Nutraceuticals is a broad umbrella term that is used to describe any product derived from food sources with extra health benefits in addition to the basic nutritional value found in foods.

- Nutraceutical products can be considered non-specific biological therapies used to promote general well-being, control symptoms, and prevent malignant processes.

- Their role in human nutrition is one of the most important areas of investigation, with wide-raging implications for consumers, healthcare providers, regulators, food producers, and distributors.

Nutraceuticals



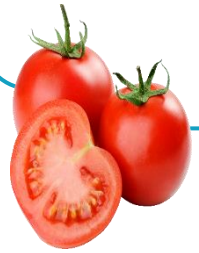
Examples of Nutraceuticals

Organosulfur compounds

Reduce total and LDL cholesterol

Catechins

Reduce risk of certain types of cancer



Lycopene

Reduce risk of certain types of cancer

Flavonoids, Phenolic acids

Antioxidant, anticancer, antiinflammatory, … etc.

Cosmeceuticals

What is meant by Cosmecuticals

- Cosmeceuticals are topical agents that offer properties of both cosmetics, which beautify or enhance appearance, and drugs, which therapeutically alter the skin’s physiology and/or reverse a disease process.

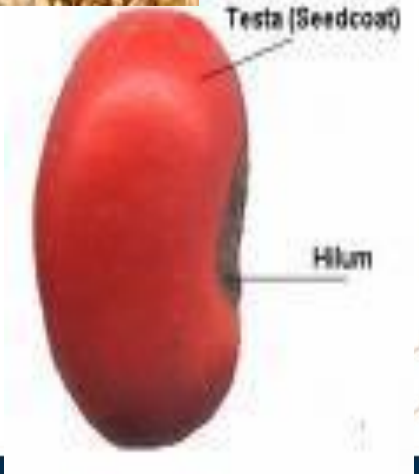
- Cosmeceuticals typically contain at least one distinguishing ingredient and purport beneficial effects beyond the abilities of purely cosmetic products, commonly claiming to improve skin function, texture, tone, radiance, or firmness.

Examples of Cosmeceutical agents used in different formulas

Liquorice

Aloe

Seeds



Definition:

Mature fertilized ovule that contains an embryo. Its function is to facilitate transportation and to ensure continuation and distribution of the plant.

A TYPICAL SEED CONSISTS OF

1- Testa formed of one or two seed coats

2- Perisperm

3- Endosperm surrounding the embryo

4- An embryo developed from the fertilized ovum

a-Cotyledons: one or two which store food for growth

b- Plumule: It is the stem growing point

c) Radicle: It forms the root system

THE TESTA SHOWS ON ITS OUTER SURFACE CERTAIN MARKINGS

- **The hilum**: It is the scar left by the removal of the seed from its funicle or stalk
- **The microphyle** : It results because the coats at the apex not quite complete leaving such a scar
- **The raphe** :Arises from fusion between the funicle with the integument

The Kernel: the structure of the seed enclosed within the testa

KINDS OF SEEDS

Albuminous seed:
a-The **embryo** is surrounded by the **endosperm** e.g. Linseed**.**
b-The **embryo** is surrounded by the **endosperm** and **perisperm** e.g. Cardamom

Exalbuminous seed:
the **embryo** alone exists within the testa
e.g. Mustard

RESERVE FOOD MATERIALS

Starch: It gives blue colour with iodine
e.g. Wheat, Maize & Cardamom

Protein
- Amorphous mass e.g. Cardamom
- Aleurone grains in ripe seeds e.g. Leguminoseae

It gives red colour with Millon's reagent and yellow ppt with picric acid

Fixed oil and fat
It gives red colour with sudan III

Ca Ox Crystals

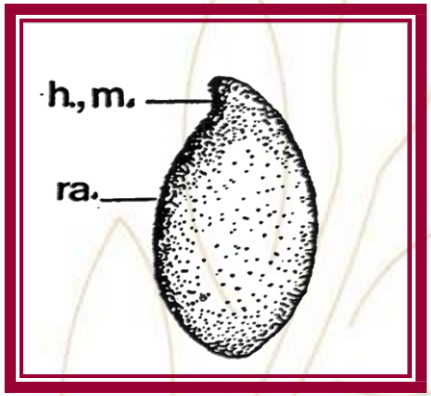
LINSEED

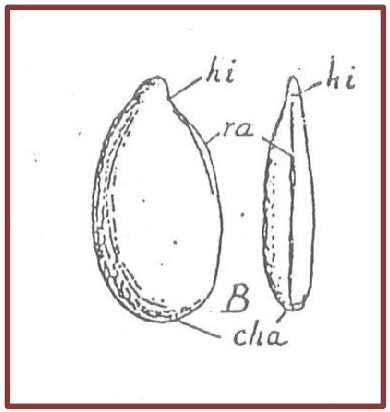
Flax Seed-Semen Lini

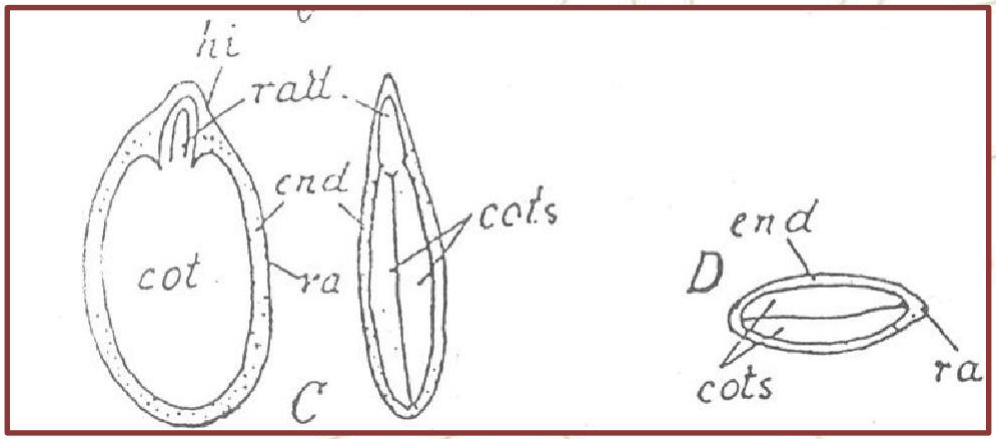
The dried ripe seeds of

***Linum usitatissimum* Linne family Linaceae.**

-Linseed yields not less than 30% of fixed oil

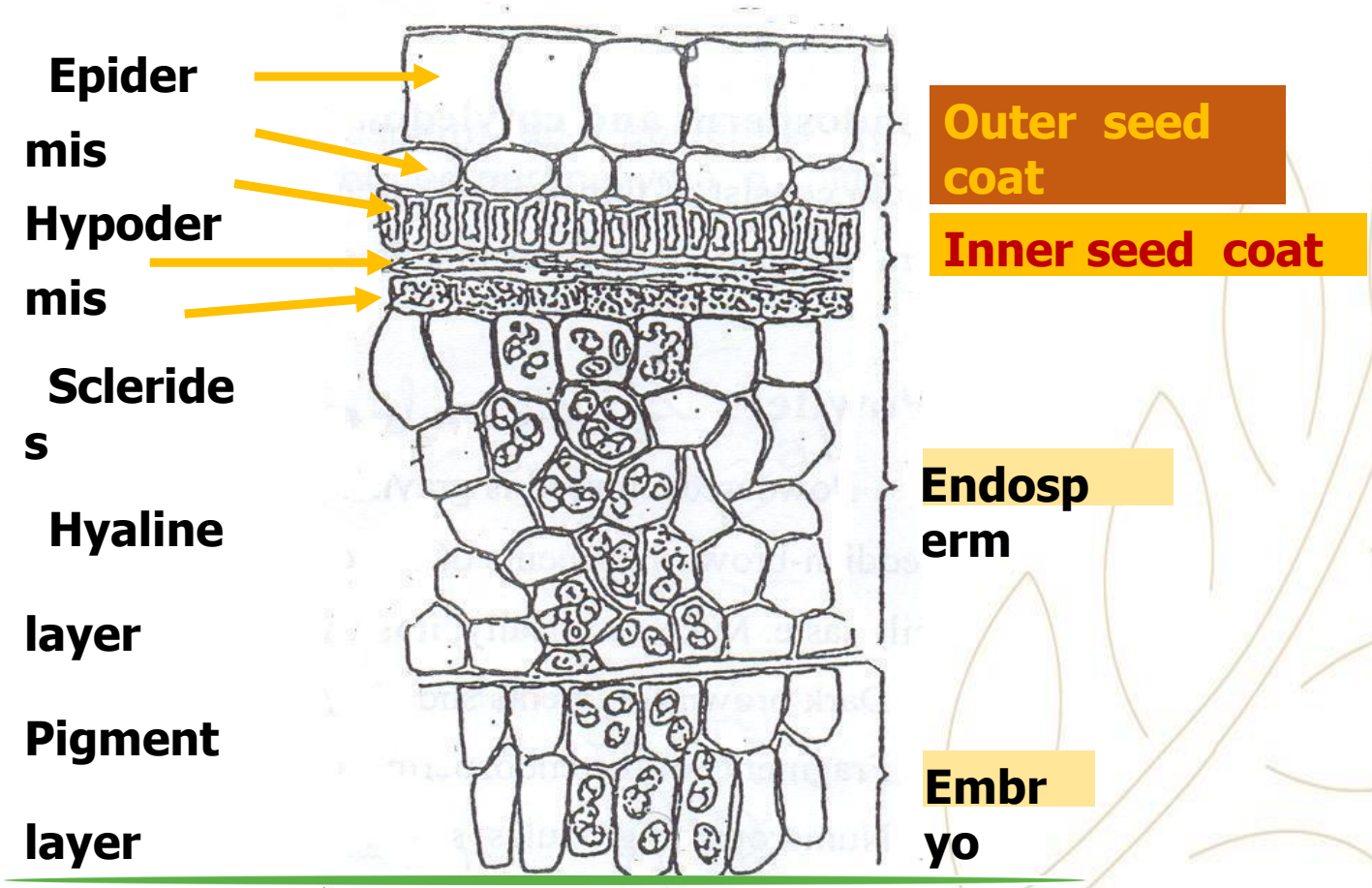






T. S. of Linseed

T.S.



- **B. Histology**
- **A-Testa: Two seed coats**

a) Outer seed coat

1. **A mucilaginous outer epidermis consisting of large isodiametric cells**
2. **Sub epidermal layer formed of 2 or 3 layers of collenchyma**

b) Inner seed coat

1- A single layer of yellowish-brown elongated sclerenchymatous cells, with pitted thick lignified walls

2- Nutritive layer: A narrow colourless layer of collapsed parenchymatous cells with their long axis at right angles to those of the sclrenchymatous layer.

3- The pigment layer: A single layer of polygonal flattened cells with pitted walls and reddish-brown contents

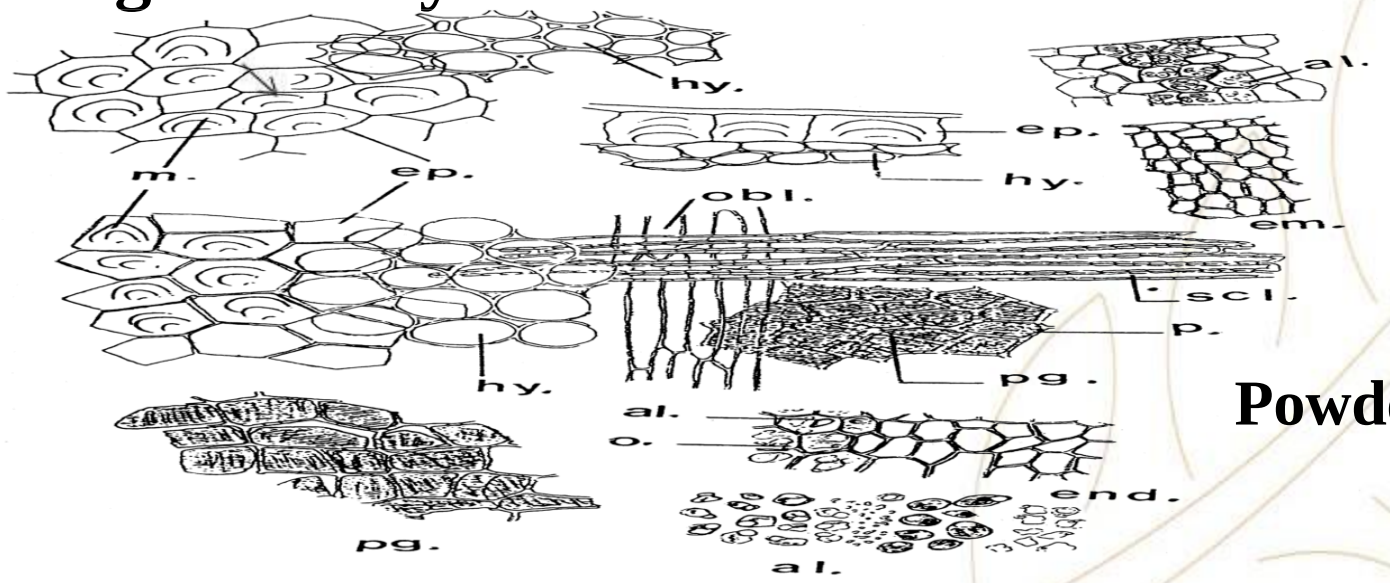
- **B- Endosperm and cotyledons**

Both consist of thin-walled parenchyma cells, filled with globules of oil and aleurone grains, up to 20 microns in diameter, each with a globoid and one or more crystalloids.

Powder

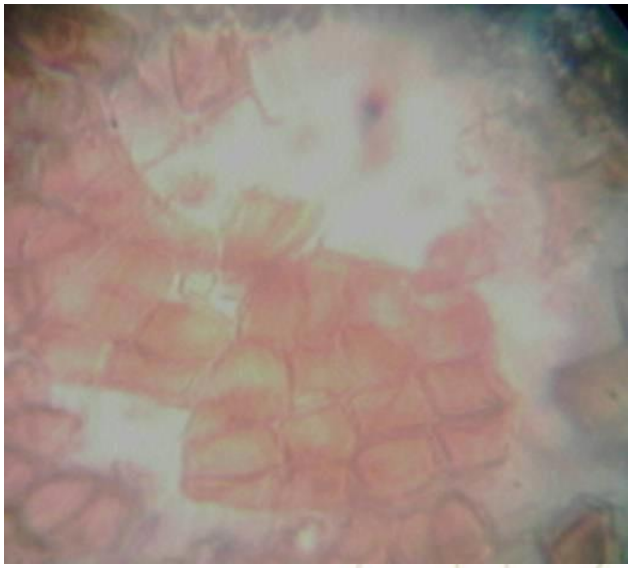
Colour: Yellowish-brown with readily visible dark reddish-brown fragments of the testa.

Odour : It has a characteristic **Taste:** mucilaginous oily.



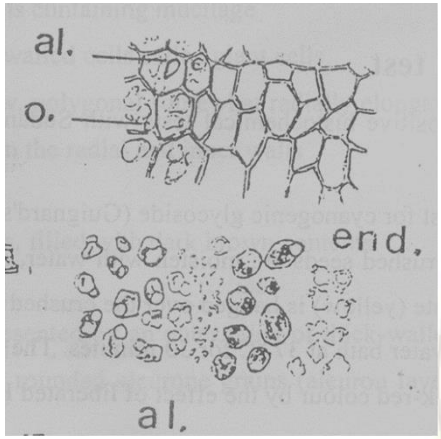
Powder linseed

Microscopically, it is characterized by:



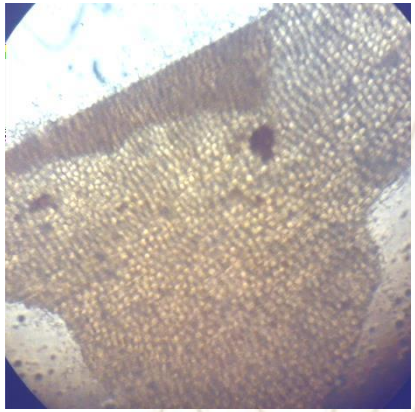
1.Dark brown fragments showing pigment cells (Polygonal flattened cells with pitted walls and reddish-brown contents)

2.Fragments of the endosperm and cotyledons

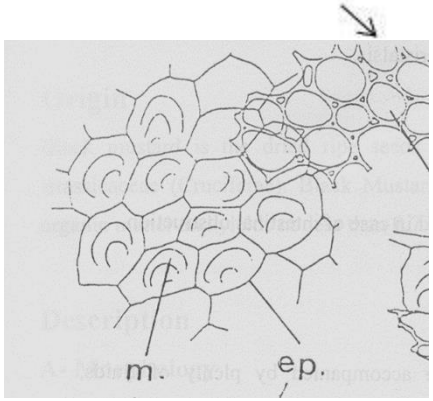


Endosperm

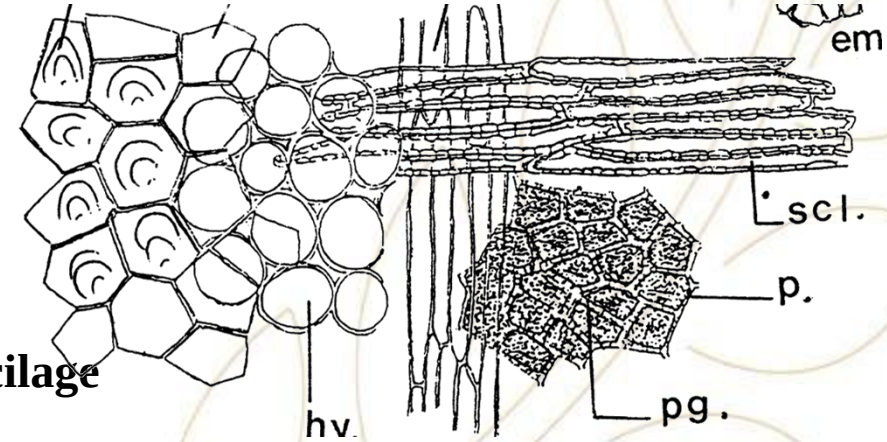
3. Fragments with yellowish-brown **sclerenchymatous cells** (appearing crossed by thin walled elongated cells on one side and by rounded somewhat thickened parenchyma on the other and accompanied by pigment layer.)



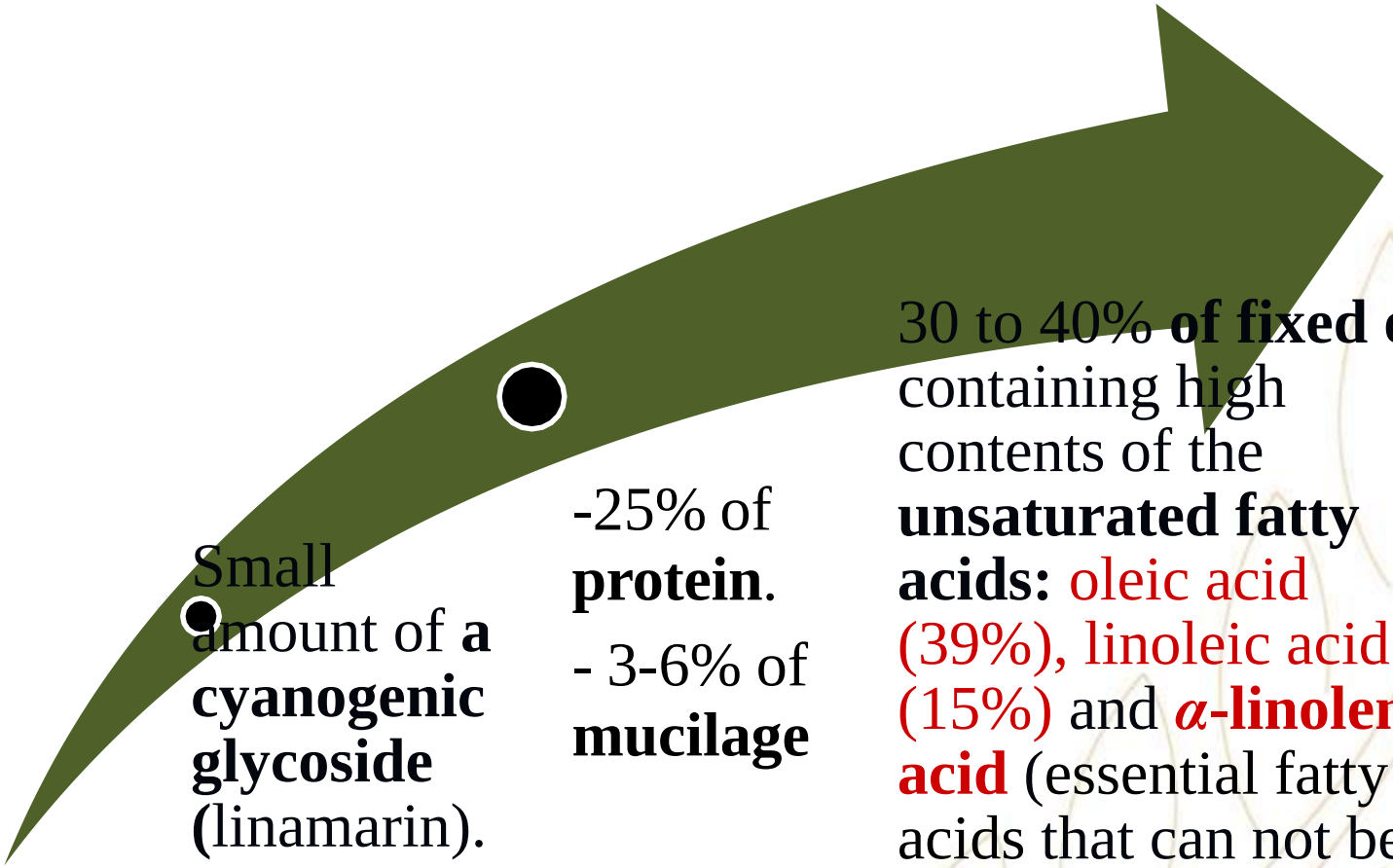
4. Mucilaginous epidermis.



Epidermis with mucilage



Active Constituents



Small amount of **a cyanogenic glycoside (**linamarin).

-25% of **protein**.

- 3-6% of **mucilage**

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).

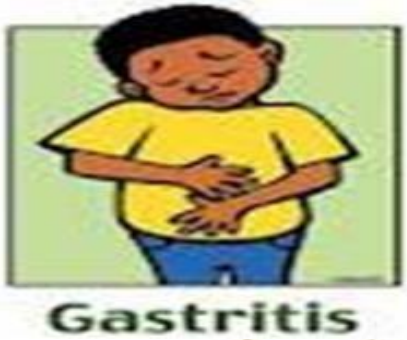
Uses & Actions Internally

1-Linseed is used in patients with <u>rheumatoid arthritis and psoriasis.</u>

Rheumatoid arthritis

Psoriasis.

Uses & Actions (cont.)



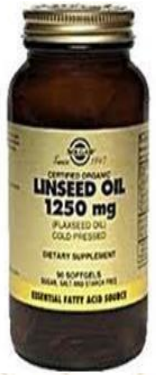
- **2-Demulcent in acute or chronic gastritis (mucilage)**

- **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 (cont.)

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



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

Uses & Actions (cont.)

6-Externally

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

-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.

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 (Iinamarin) 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:

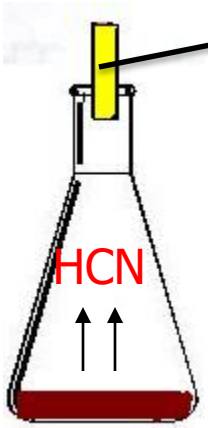
1-General test for cyanogenic glycoside (Guignard's paper test):

Yellow

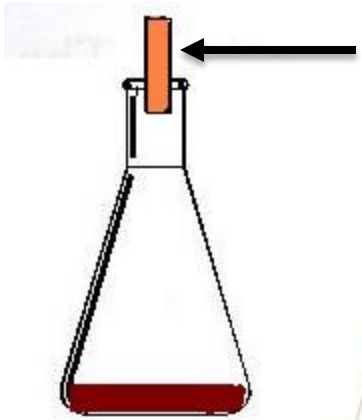
Brick Red

crushed

Moist with water



Na picrate paper



Na picramate

Linamarin glycosides —(37 °C, Linamarase enzyme)→ ↑ HCN

Chemical tests (cont.)

2 For Mucilage :

Red colour with Ruthenium Red

3 For Fixed oil :

Red colour with sudan lll

4 For Proteins:

Millon's reagent : red

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 ……, ……..,……, ……

Faculty of **Pharmacy**

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IN EGYPT SINCE 1996
Established by Dr.Nawal El Degwi
October Univeristy for Modern Sciences and Arts
جامعة أكتوبر للعلوم الحديثة والآداب

Thank You!

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