

PLANT LIPIDS

Lipids are natural substances, which are esters of fatty acids and alcohols or polyols.

Fixed or vegetable oils are simple lipids, ester of fatty acids and glycerol.

1. MACROMORPHOLOGICAL EVALUATION

Ricini semen

Cucurbitae semen

Papaveris semen

2. PHYSICAL-CHEMICAL AND CHEMICAL QUALITATIVE INVESTIGATION OF FIXED OILS

2.1. Physical characteristics

Refraction values-measured by Abbe-refractometer

2.2 TLC investigation of unsaponifiable matter of fixed oils

3. QUANTITATIVE EVALUATIONS

3.1 Determination of fixed oil content of crude drugs (oily seeds)

3.2 Determination of unsaponifiable matter of fixed oils

1. MACROMORPHOLOGICAL EVALUATION

Ricini semen

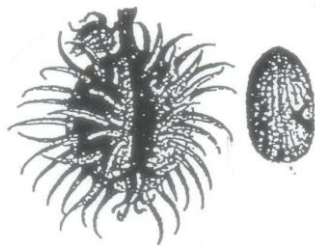
Ricinus communis L.

Toxic!

Castor oil seed or Castor bean

Euphorbiaceae

The fruit is a three-celled spiny capsule, each cell containing an ovoid albuminous seed of bean shape. The seed is anatropous, elliptical-ovoid, somewhat compressed, from 8 to 18 mm in length, and from 4 to 7,5 mm in thickness, externally it is mottled grayish and brown, varying considerably in color, smooth, with a prominent whitish caruncle.



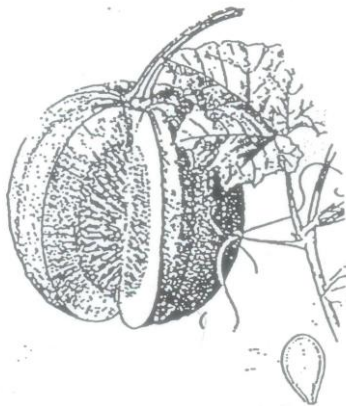
Cucurbitae semen

Cucurbita pepo L.

Pumpkin seed

Cucurbitaceae

The seed of plant is covered by green pellicle but it is in generally removed. Its shape is ovoid and its upper peak is pointed, there are the root and axle of germ.



Papaver somniferum L.

Poppy seed

Papaveraceae

The seed of poppy plant is small, blue, grey or redish. Its taste and odor are pleasant but in air or in sunshine, its taste becomes bitter



Oleum ricini
Ricinus communis L.
Ph.Hg.VIII., Ph. Eur.

Castor oil
Euphorbiaceae

Castor oil is cold-pressed oil obtained from seed of *Ricinus communis*. It is a pale yellowish or almost colorless, transparent liquid. It has a faint, mild odor and characteristic taste.

Oleum lini
Linum usitatissimum L.
Ph. Hg.VIII., Ph. Eur.

Linseed oil
Linaceae

Linseed oil is the fixed oil obtained by pression from the ripe linseeds. It is a yellow, oily liquid having a peculiar odor and disagreeable taste. When exposed to the air, it thickens and darkens.

Oleum helianthi
Helianthus annuus L.
Ph.Hg.VIII. Ph.Eur.

Sunflower achene-oil
Asteraceae

It is obtained from the riped sunflower achenes. It is a yellow, clear, transparent fixed oil. When exposed to the air it thickens half. It is odorless and it has oily taste.

Oleum boraginis
Borago officinalis L.

Borago oil
Boraginaceae

It is obtained from the riped seeds. It is yellowish with characteristic odor and it has oily taste.

Oleum oenotherae
Oenothera biennis L.

Oenothera oil
Onagraceae

It is obtained from the riped seeds. It is yellowish with characteristic odor and it has oily taste.

Oleum sojaj
Glycine max L.
Glycine hispida Moench
Glycine soja Sieb. G. et Zucc.
G. hispida Moench

Soybeen oil
Fabaceae

It is obtained from the riped seeds by pressing, it is gold-yellow with agreable oil odor.

Oleum papaveris
Papaver somniferum. L.

Papaver oil, poppy seed oil
Papaveraceae

It is obtained from the riped seeds by pressing. It has agreable odor.

Oleum cucurbitae
Cucurbita pepo L.

Pumpkin seed oil
Cucurbitaceae

It is obtained from pumpkin seed by pressing.

2. PHYSICO-CHEMICAL AND CHEMICAL QUALITATIVE INVESTIGATIONS OF FIXED OILS

2.1. Physical characteristics

Determination of Refractive index by Abbe-refractometer

Samples (commercial oils):

	Values of the European Pharmacopoeia:
Helianthi annui oleum raffinatum	1,475
Iecoris aselli oleum	1,478
Lini oleum virginale	1,480
Papaveris oleum	-
Olivae oleum raffinatum	1,463
Ricini oleum virginale	1,478
Soiae oleum raffinatum	1,477
Tritici aestivi oleum raffinatum	1,472

2.2. TLC investigation of unsaponifiable matter of fixed oils

Detection of β -sitosterol and other sterols.

Dissolve the dried unsaponifiable matter in 5 ml of petroleum ether or n-hexane.
Use 5-10 μ l of these solution for TLC investigation.

Samples:

1. Lini oleum
2. Oenotherae oleum
3. Ricini oleum
4. Helianthi oleum

Reference solution: 5 μ l of β -sitosterol (mg/ml) in n-hexane

TLC parameters

<i>Adsorbent:</i>	Kieselgel 60 F ₂₅₄ (Merck, 0.2 mm)
<i>Developing system:</i>	n-hexane-ethylacetate (3:1)
<i>Reagent:</i>	0,5% of cerium-sulphate in H ₂ SO ₄ . Warm the plate for 5-10 min at 100°C
<i>Evaluation:</i>	identification of β -sitosterol in samples ~ R _f value of β -sitosterol: 0.49, bluish viola spot

3. QUANTITATIVE EVALUATIONS

3.1. Determination of fixed oil content of crude drugs (oily seeds)

Samples:

poppy seed
linseed
pumpkin seed
sunflower achene

Shake 5 g of grinded seed with 50 ml of n-hexane or petroleum ether (bp. 30-50°C) on ultrasonic bath at room temperature for 25 minutes. Filter the solution on Na₂SO₄ sicc. and eliminate the solvent in vacuum (Rotadest). Measure the mass of the residue and calculate the percentage (%) fixed oil content of the crude drugs.

3.2. Determination of unsaponifiable matter of fixed oils (Ph.Hg. VIII., Ph.Eur.)

Samples:

Ricini oleum
Lini oleum
Helianthi oleum
Oenotherae oleum

The usaponifiable matter is the part (in % ^m /_m) of fixed oil which cannot be saponified by alkali-hydroxide but it can be extracted with petroleum ether.

Reflux 3 ml of fixed oil with solution of 3,4 g of KOH in 30 ml etanol, for 60 min. Add 30 ml of water to the reaction mixture and leave to cool it. Extract the wateric extract in a sperator funnel 3x60 ml of petroleum ether or n-hexane. Unite the organic phases and wash out with 3x30 ml of water to remove the alkaline traces. Dry the petroleum ether solution with Na₂SO₄ sicc., filter and evaporate it. Dry the residue (the unsaponifiable matter) at 105°C and measure its mass (a).

$$\% = \frac{100a}{m}$$

m: the mass of fixed oil used for investigation (calculated by density)

Remark:

Dissolve the residue in petroleum ether, use for TLC investigation (see 2.2.)

Report
Refraction values of fixed oils
Fixed oil content (%) of crude drugs (oily seeds)
Unsaponifiable matter (in %) of fixed oils
TLC investigation of sterols in unsaponifiable matter of fixed oils