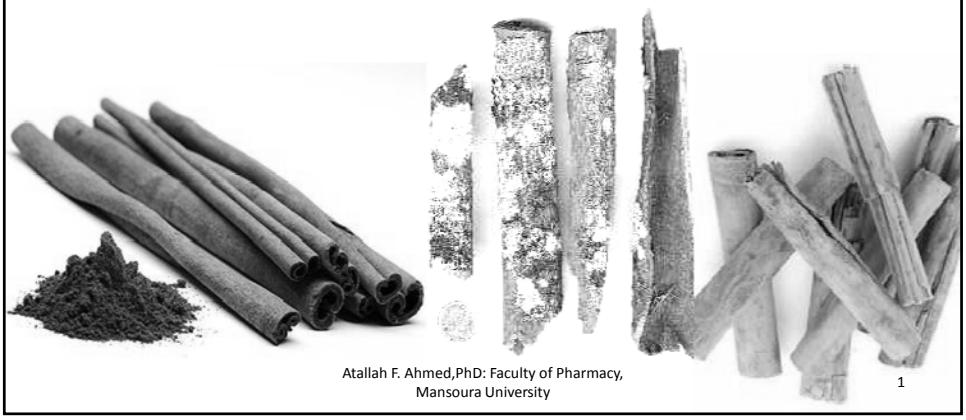
# Medicinal Barks

*Atallah F. Ahmed*, PhD



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# *Canella* Bark

## Wild Cinnamon Bark

***Cortex canella***

**It is the dried bark obtained from *Canella alba (Canellaceae)***
**G. Source: Carrabin Islands and Florida.**
**Odor: agreeable spicy odor (as if a mix of clove and cinnamon).**
**Taste: pungent and bitter taste.**
**Volatile oil occurs in brown oil cells of cortex and phloem.**
**Absence of phloem fibers.**

***Important Microscopical Features of powder canella bark***

**abundant *sclereids of phelloderm***

**Pale brown Cork cells**

**Oval Oil cells associated with phloem parenchyma**

**Clusters of CaOx**

***Starch granules***



## Active Constituents

**Volatile oil (1%) which contains:**

- **Eugenol.**
- **3-Methoxy-4,5-methylene-dioxycinnamaldehyde.**
- **Canellal (sesquiterpene dialdehyde).**
- **Cineole.**

**NO TANNIN**

## Uses

- **Aromatic stimulant and tonic.**
- **Canella oil is antimicrobial, antifungal and cytotoxic.**
- **It is employed in West Indies as a spice, and has been advised in *scurvy*, and in *post partum*, and *carcinomatous menorrhagia*.**

# *Quillaia* Bark

## Soap Bark

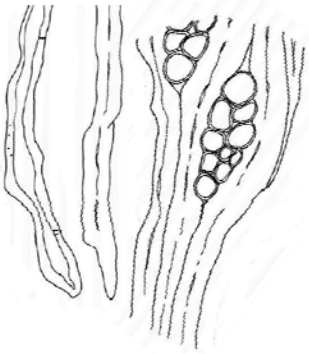
***Cortex quillaja***

- It is the dried <u>inner bark</u> of ***Quillaia saponaria*** (Rosaceae) and deprived of most of adhering rhytidome (not more than 5%).
- G. Source: Peru and Chile and cultivated in India and California.
- Although the bark is almost odorless, its powder is sternutatory (cause prolonged fits of sneezing due to extreme irritation of nose and faucets).
- Acrid unpleasant taste– Yellowish white with brown streaks (?).
- Fracture is splintery and lamellate

**<u>Significant Microscopical Characters of Bark</u>**

- The 2ry phloem consists of tangential bands of lignified fibers alternated with bands of phloem parenchyma and sieve tubes.
- The fibers are tortuous, bent and sometimes forked at the end (up to W. 50 μ and L. 1 mm).
- Few sclereids are present associated with the fibers.
- Phloem parenchymatous cells contains large tab prisms of CaOx.
- MR are 3 to 4-seriate with few prisms of CaOx.
- Rare Cork.

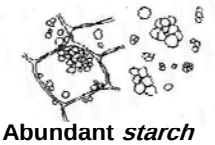
## ***Important Microscopical Features of powder quillaia bark***



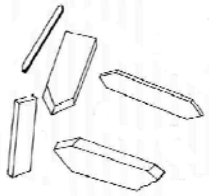
**Abundant phloem *fibers: singly or in groups associated with MR* in TLS. The fibers are bent, irregular, or tortuous in outline with lignified walls and uneven lumens.**

**Few Lignified *sclereids of two types:***

1. ***Small square to* oval in outline with thin walls and numerous pits.**
2. **Larger less regular in outline and have thick faintly striated walls, and have few pits.**



**Abundant *starch granules (mostly simple)*; occur scattered or, as compact masses in the parenchyma**

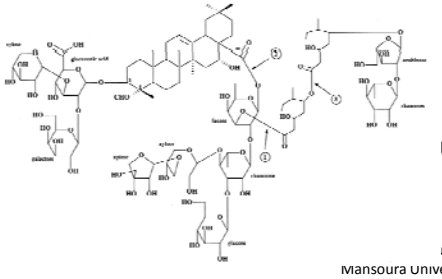


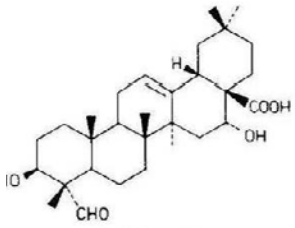
***Abundant* elongated *prisms of CaOx crystals* of large sizes.**

## Active Constituents

- **Saponin glycosides 10% (glycosides of quillaic acid):**
  - **Acid saponin (quillajic acid)**
  - **Neutral saponin (quillaja-sapotoxin).**

**They are strongly sternutatory and have an acrid taste. Unlike oral administration, all saponins are toxic when introduced directly into the circulation (causing hemolysis). Almost all of them stupefy fish even in small proportion (1: 200,000).**






Quillaic acid aglycone

## Uses

- Its tincture is used as emulsifying agent and its liquid extract may be used as a lotion for washing scalp, before treatment.
- As Expectorant , and acts on the bronchiolar cells reflexly by irritating the stomach. (now it is not favorable, why?)
- Like most other expectorants, in large doses it is emetic; it is contra-indicated in inflammatory conditions of the stomach or intestines.
- Immuno-stimulant.

### Test for Identity

The powder gives a permanent froth when shaken with water.



# *HAMAMELIS* Bark

## WITCH-HAZEL Bark

***Cortex Hamamelidis***

- It is the dried bark of *Hamamelis virginiana (Hamamelidaceae).*
- G. Source: Hamamelis trees are indigenous to North America.
- Pinkish-brown color
- Astringent slightly bitter taste
- Odorless.

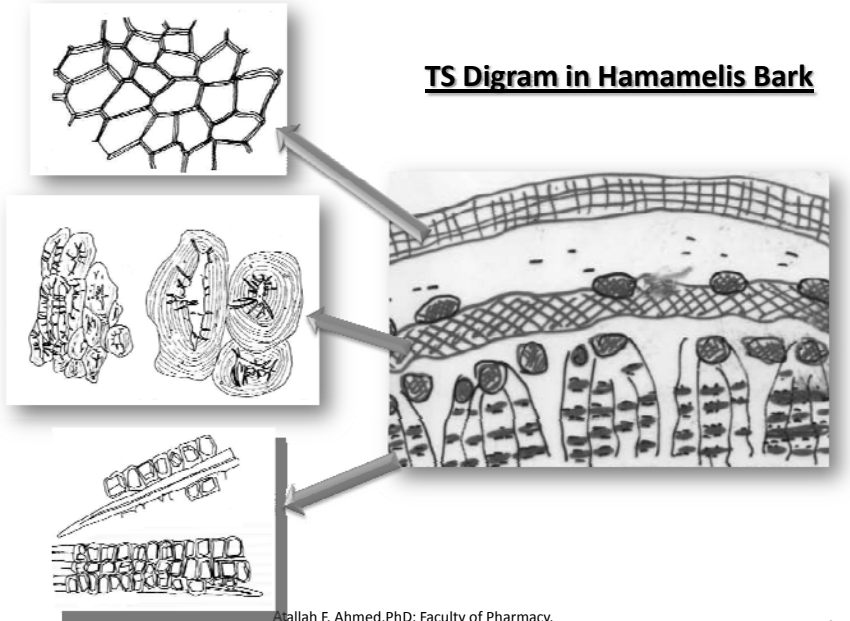
**Significant Microscopical Characters of Bark**

- Cork cells are thin walled.
- Cortex: parenchymatous (starch granules and prisms of CaOx).
- Pericycle: *sclerenchymatous* (evenly thickened lignified Selereids with external small groups of pericyclic fibers.
- Phloem: shows tangential bands of lignified phloem fibers surrounded with crystal sheath of prisms of CaOx.
- Selereids are also present in the outer part of phloem.
- MR are uniseriate.
- Starch is rare.



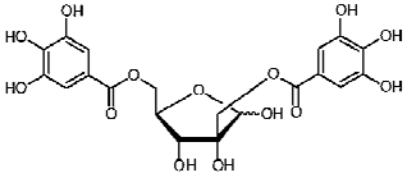
**Diagnostic elements of powder**

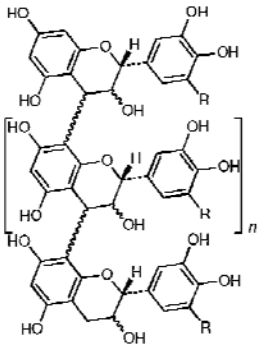
**TS Digram in Hamamelis Bark**



## Active Constituents

- Tannins (6% ):
  1. Gallo- and ellagitannin (hamamelitannin).
  2. Condensed tannin (proanthocyanidin).
- Gallic acid.
- Bitter principle.



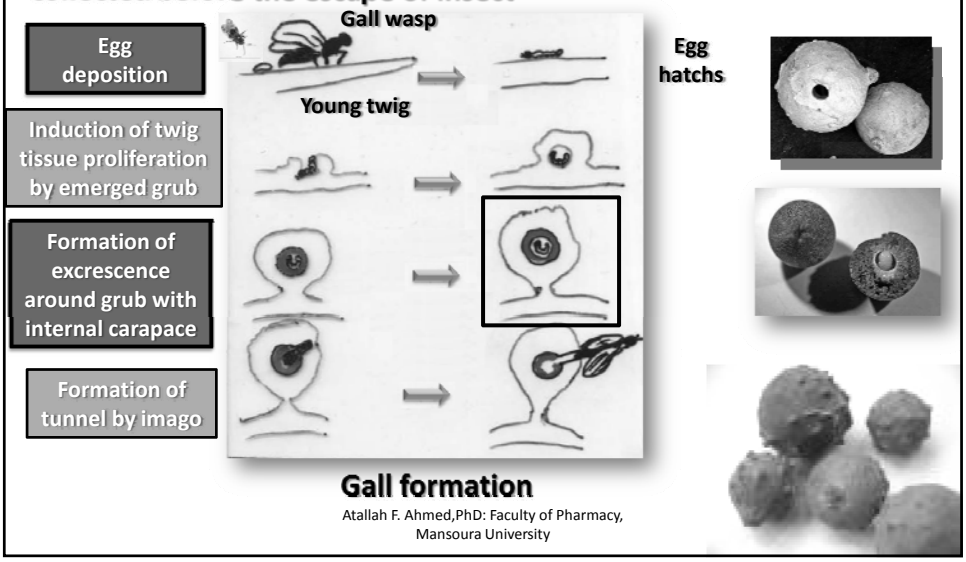


## Uses

- Astringent.
- Haemostatic : used in treatment of hemorrhage of nose, lungs, rectum and uterus).



**Aleppo Galls are a pathological outgrowth formed on the young twigs of Oak tree, *Quercus infectoria (Fagaceae )* due to deposition of eggs of gall wasp, *Cynips galloetinctoria (Cynipidae)* and are collected before the escape of insect.**




**Gall formation**

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**Gall formation**

- **Insect lays eggs near twig tips in spring or early summer.**
- **Larvae hatch, penetrate the epidermis, and feed on soft tissues.**
- **Enzymatic fluids secreted from larva stimulate rapid cells division.**
- **production of new tissue with abnormally enhanced metabolism**
- **Formation of rounded excrescence (gall) in which larvae are enveloped by a spherical sclerenchymatous carapace.**
- **In the carapace, larva is supplied with carbohydrates and other nutrients until it reaches maturity through the pupa stage. The residue of the gall, which appear to protect the pupa until it emerges as a gall-wasp, becomes rich in tannins.**
- **The process always takes about *5-6* months, after which the mature insect bores its way out of gall unless the galls are previously collected and dried.**

**Macroscopical Characters:**
***Shape:*** **sub-spherical**
**Size: D. 12-20 mm.**
**Color: dark bluish green or olive green.**
**Odor: odorless.**
**Taste: intensely astringent, followed by a slight sweetness.**
**Texrture: hard and horny**
**Fracture: short and horny**
**External Features: at basic region it shows a short stalk an dat apical region it**
**shows numerous rounded projections.**
**Internal Features: pale buff in color with a small central cavity, surrounded by**
**a hard layer and generally contains the remains of larva, pupa or insect.**



**Microscopical Characters of Gall**

**I. Metaderm: 1-3 layers of small brown tabular cells, with thickened suberized walls.**

**II. Middle Parenchymatous Layer**

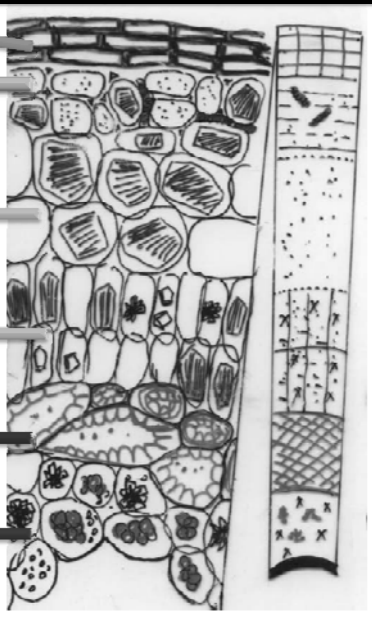
**II.1. Dense outer zone of rounded to polygonal thick cells with chloroplasts and tannin plates, and traversed by small vascular strands.**

**II.2. Middle zone of larger rounded to polygonal thin cells with large intercellular spaces and contain tannin plates.**

**II. 3. Inner zone of radially elongated cells, containing tannin plates, prismatic and cluster crystals of CaOx.**

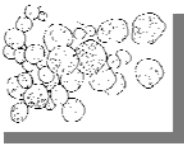
**III. Hard sclerenchymatouts Carapace: band of three types of selereids: fibrous, isodiametric and large ovoid types.**

**IV. Innermost Parenchyma of thin rounded cells containing brown masses of lignin bodies and starch granules. Some cells contain cluster crystals of CaOx.**



## Diagnostic elements of powder

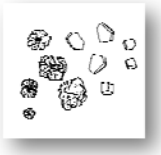
Buff or yellowish-grey
Odorless
Intensely astringent taste



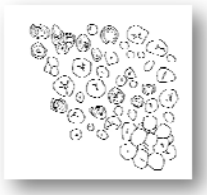
Brown masses of lignin bodies (stained red with phloroglucinol + conc. HCl).

Scattered angular tannin plates (stained blue with methylene blue).

Lignified Selereids of three types:
- Fibrous: (uneven thick walls and tapered ends),
- Isodiametric:(with heavily thickened striated walls and narrow lumen)
- Large ovoid (thinner wall and wide Lumen)



Scattered cluster and prisms of CaOX



Starch granules, mostly simple with slit or cleft hila.

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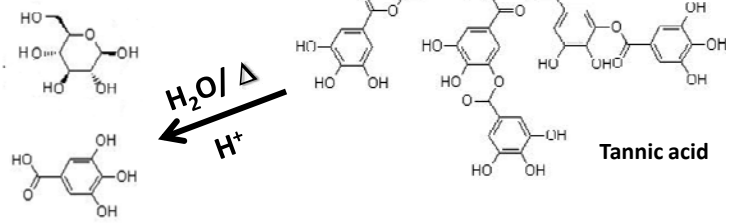
## Active Constituents:

- 50-70% (Gallotannins: Tannic acid).
- 2-4% Gallic acid.
- Ellagic acid.

[Tannic acid,
by hot water or
by acid hydrolysis
→ gallic acid + glucose]




Tannic acid

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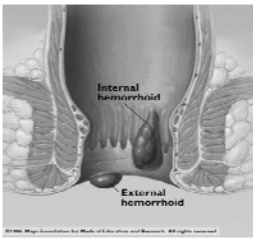
## Uses

**Medicinal use:**

**1.Topically as local astringent in the form of ointment or suppositories in treatment of haemorroids and as haemostatic**
**2.Intemally as anti-diarrhae in dysentery.**

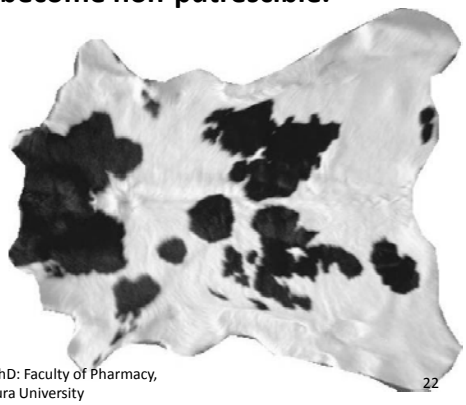






## Industrial use:

**1.Manufacture of common inks, where tannic acid reacts with the iron salts to form dark bluish-black compounds.**
**2.Leather production, where crushed galls (tannic acid) interact with the connective tissues of animal skins (hides) and causes skins to harden and shrink and become non-putrescible.**

# THANK YOU