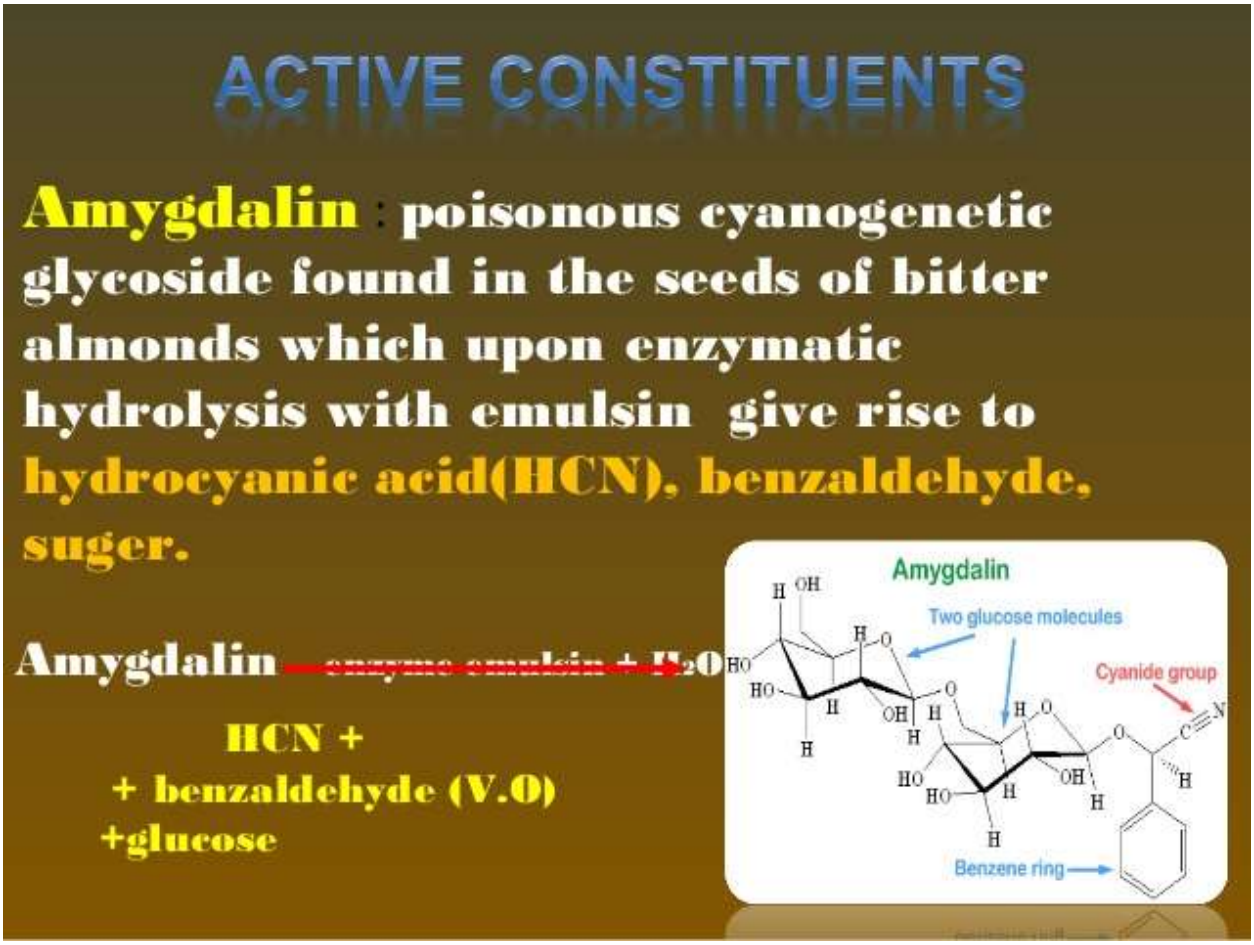
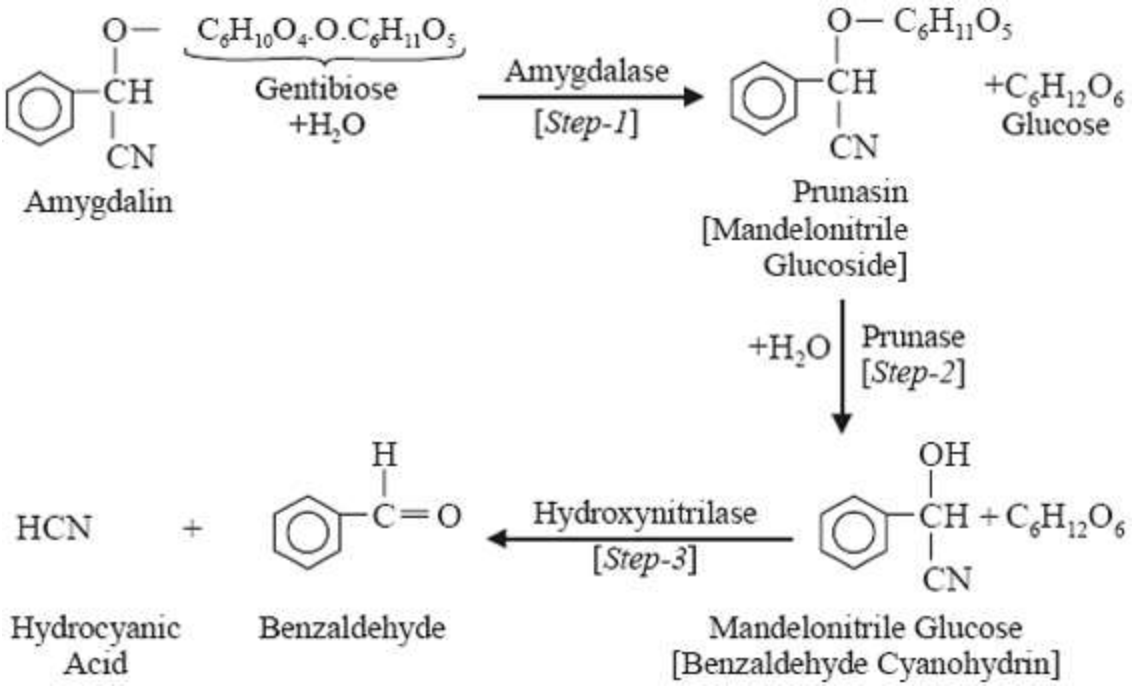
1. . PHARMACOGNOSY Almond Oil
2. . OBJECTIVES References Uses Production Active Constituent Types History Introduction
3. . BOTANICAL ORIGIN: Prunus amygdalus FAMILY: Rosaceae COMMON NAME: Almond milk , almond oil , amygdale amara , amygdalin , bitermandel , bitter almond , oil of almonds , volatile almond oil Prunus: classic name of plum tree Amygdalus: almond tree (Greek word)
4. . HABITAT: The tree is native to Asia ,Iran and Syria and is cultivated and naturalized in all tropical and warm temperate region. Commercial products are obtained mostly from Sicily, southern Italy, southern France ,northern Africa and California .
5. 5. The sweet almond is mentioned early in old testament as one of the fruits Israel commanded his sons to carry from Palestine as a gift to Egypt Theophrastus makes several references to the almond Charlemagne introduce the tree on imperial farms and in fourteenth century almond was an important item in Venetian trade
6. . Almonds are a familiar type of nut. They can be sweet or bitter, depending on the type of tree. Sweet almond (Prunus amygdalus var. dulcis) and does not contain poisonous chemicals. The sweet almond is 2-3 cm in length. Rounded at one end and pointed at the other. Bitter almond from (Prunus amygdalus var. amara) and contain toxic chemicals.The bitter almond is 1.5-2 cm in length but of similar breadth to the sweet almond.
7. . Oleic acid (77%) Linoleic acid (17%) Palmitic acid (5%) Myristic (1%)
8. . CONSTITUENT OF BITTER ALMOND OIL 2.5-4% colorless, crystalline, cyanogenetic glycoside amygdalin Benz aldehyde 21% hydrocyanic acid

9. . Both bitter and sweet almonds are expressed for their fixed oil (45-50%) by expression from the kernels of varieties of P.amygdalus. Bitter almonds after maceration to permit hydrolysis of amygdalin, also yield Essential or volatile oil that is used as flavoring agent . Oil is pale yellow liquid with a slight odor & bland, nutty taste.
10. . Almond oil is obtained by grinding the seeds and expressing them in canvas bags between slightly heated iron plates . They are sometimes blanched before grinding. It contains a considerable amount of olein ,with smaller quantities of the glycosides of linoleic and other acids. The Benz aldehyde and hydrocyanic acid are separated by steam distillation.
11. . Used In The Preparation Of Many Toilet Articles Used As Ingredient In Cosmetic When Taken Internally, It Has Mild Laxative Action
12. . As A Vehicle For Oily Injections Used As Flavoring Agent Used As Emollient





Chemical constituents

1. Fixed oil 40 -55%
2. Proteins
3. Enzyme emulsin
4. Glycoside :Cyanogenic group – Amygdalin.

Amygdalin $\xrightarrow{\text{enzyme emulsin} + H_2O}$ HCN +

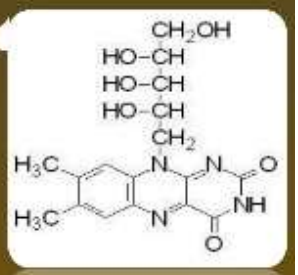
+ benzaldehyde (V.O) +glucose

Main slide

ACTIVE CONSTITUENTS

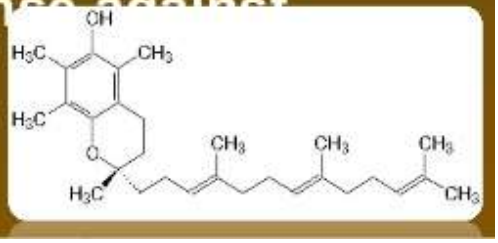
Riboflavin :is essential for oxidation reduction reactions in t cell and

in cellular respiration.



Vitamin E :is the major antioxidant in body tissues and is defence against lipid peroxidation,

protecting cell membranes from free radical attack



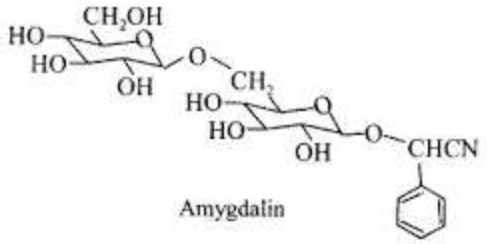
Size : Length = 1.5 to 2 cm; Breadth = 12.5 mm;
Thickness = 8 mm

Shape : Oblong, ellipsoidal, rounded at one end and pointed at the other.

Solubility : Insoluble in ether, but soluble in water and boiling alcohol.

Preparation The cyanogenetic glycoside **amygdalin** is usually obtained from either the cake of bitter almond or other prunaceous seeds after the expression of the fixed oil. The cake is subjected to extraction with ethanol (95%, v/v), and the resulting alcoholic extract is concentrated to a small volume preferably under vacuum and mixed with a large volume of ether, when the desired glycoside will separate out as a crystalline product.

Chemcial Constituent **Bitter almond** contains a colourless crystalline cyanogenetic bitter glycoside commonly termed as **amygdalin** present to the extent of 1-3% as given below:



Amygdalin

Amygdalin upon enzymatic hydrrolysis with **emulsin** gives rise to one mole each of benzaldehyde and hydrocyanic acid plus two moles of glucose as follows:

$$\underset{\text{Amygdalin}}{C_{20}H_{27}NO_{11}} + 2H_2O \xrightarrow[\text{(Hydrolysis)}]{\text{Emulsin}} \underset{\text{Benzaldehyde}}{C_6C_5—CHO} + \underset{\substack{\text{Hydro–}\\\text{Cyanic acid}}}{HCN} + \underset{\text{Glucose}}{2C_6H_{12}O_6}$$

Besides, **bitter almond** contains fixed oil (40-50%), proteins (20%), volatile oil (0.5%) and an enzyme emulsin.

The enzymatic hydrolysis of **amygdalin** takes place in the following *three* steps, namely:

(*a*) The enzyme **amygdalase** helps to cleave the glycoside amygdalin first into one mole each of glucose and **prunasin** (or mandelonitrile glucoside),

(*b*) The enzyme **prunase** helps to liberate the second molecule of glucose with the formation of the aglycone *mandelonitrile* (or benzaldehyde cyanohydrin), and

(*c*) The enzyme **hydroxynitrilase** helps to break down the mandelonitrile into one mole each of benzaldehyde and hydrocyanic acid.

All these *three* steps may be summarised as given below:

TYPES OF ALMONDS

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They can be sweet or bitter, depending on the type of tree.

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Description and Bitter Almond Origin

- Perennial mild trees about 5 m height .
- The seeds length from 1.5 cm to 5 cm, rounded from one end and pointed at the other end.
- The seeds color : Cinnamon brown .
- Odor : characteristic (benzaldehyde odor) .
- Taste : bitter .
- Origin: Iran & M.S.R and now cultivated in the warm temperate regions .