



COMPLETE CONCEPT



B.PHARMA | 5 SEMESTER

GENERAL INTRODUCTION OF CRUDE DRUG WITH CHEMISTRY

**ALKALOIDS | PHENYLPROPANOIDS | STEROIDS |
VOLATILE OILS | TANNINS | RESINS | GLYCOSIDES**

UNIT-2



B. PHARMA 5TH SEM ONE SHOT NOTES

UNIT-2

GENERAL INTRODUCTION OF CRUDE DRUGS WITH CHEMISTRY

ALKALOIDS

Definition

Alkaloid” (alkali-like) is the term “alkaloid” (alkali-like) is commonly used to designate basic heterocyclic nitrogenous compounds of plant origin that are physiologically active.

Distribution and Occurrence

- Rare in lower plants.
- Dicots are more rich in alkaloids than Monocots.
- Families rich in Alkaloids: Apocynaceae, Rubiaceae, Solanaceae and Papaveraceae. Families free from Alkaloids: Rosaceae, Labiatae.

Functions in Plants

- May act as protective against insects and herbivores due to their bitterness and toxicity.
- Act as growth regulators in certain metabolic systems.
- They may be utilized as a source of energy in case of deficiency in carbon dioxide assimilation.

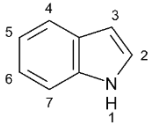
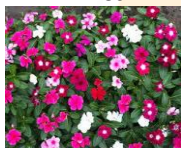
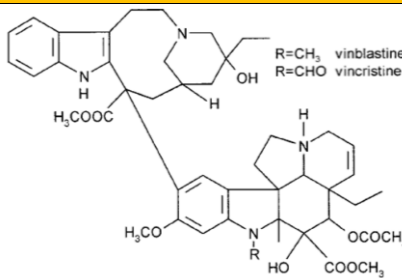
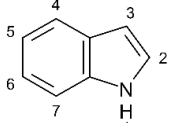

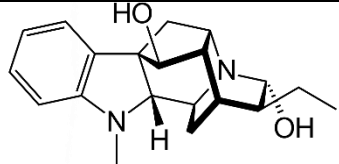

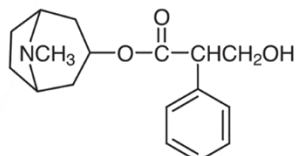

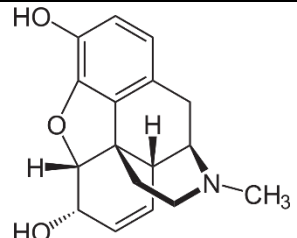
Physical Properties

- Most alkaloids are crystalline solids.
- Few alkaloids are amorphous solids e.g. emetine.
- Some are liquids that are either: Volatile e.g. nicotine and coniine, or Non-volatile e.g. pilocarpine and hyoscine.

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Color:

- The majority of alkaloids are colorless but some are colored e.g.:
- Colchicine and berberine are yellow.
- Canadine is orange.
- The salts of sanguinarine are copper-red.

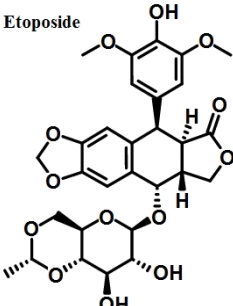
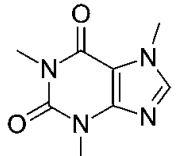
Chemistry	Plant	Introduction	Source	Chemical composition	Uses	Structure
Indole alkaloids 	Vinca 	Periwinkle, Sadabahar Family- Apocynaceae	Cataranthus roseus	Vincristine Vinblastine	Antineoplastic agent, Hodgkin's lymphomas.	
Indole alkaloids 	Rauwolfia 	Chhotachan, Sarpagandha	Rauwolfia serpentina.	Ajmaline Ajmalacie	Antihypersensitive	
Tropane	Belladonna 	Deadly night shade leaf Family- Solanaceae	Atropa belladonna	1-hyoscyamine	Parasympathetic drug	
Phenanthrene derived alkaloids	Opium 	Afim. Family- Papaveraceae	Papaver somniferum	Morphine Codeine	Analgesic. Sedatives	

PHENYLPROPANOIDS & FLAVONOIDS

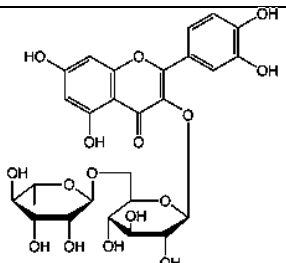
- Phenylpropanoids are diverse family of organic compounds that are synthesized by plant from amino acid, phenylalanine and tyrosine with the help of enzymes phenylalanine ammonia lyase.
- These are present in many plants species and are used as UV light protection
- They regulate a wide range of physiological process such as pigmentation of flower and fruits
- It also used as anti-inflammatory and analgesic activity.

➤ Flavonoids-

- Flavonoids are polyphenolic compounds and available in maximum plant they are generally yellow colour pigments.
- They have main role as antioxidant activity with anti-inflammatory and immune system benefits.

Chemistry	Plant	Introduction	Source	Chemical composition	Uses	Structure
Topoisomerase class	Lignans	Family: Berberidaceae First introduced by Haworth (1948).	wide variety of plant	Etoposide	Antiviral, Anti-inflammatory	
Trimethyl xanthine	Tea	Camelia thea Family- Theaceae	Thea sinensis	Gallotannic acid, caffeine	Stimulant effect on nervous system.	

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Rhamnoglucoside	Ruta	Family- Rutaceae	Ruta graveolens	Rutin	Antioxidant Anticancer Antitussive	
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STERIODS, CARDIAC GLYCOSIDES & TRITERPENOIDS

➤ **Steroids -**

- steroid, any of a class of natural or synthetic organic compounds characterized by a molecular structure of 17 carbon atoms arranged in four rings.
- They contain cyclopentoperhydrophenanthrene ring structure
- Plant steroid possess many medicinal uses such as anticancer antibacterial.

➤ **Cardiac Glycosides**


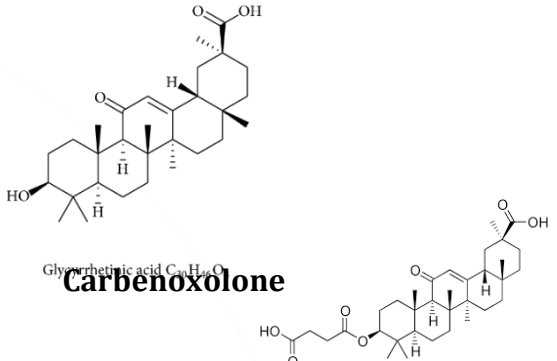

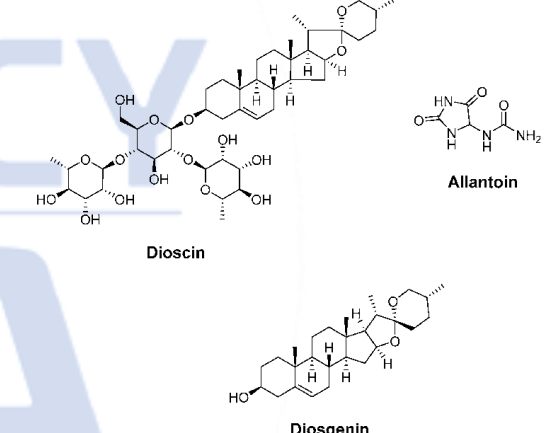

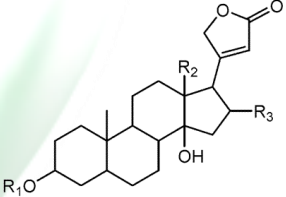
- cardiac glycoside are a class of organic compound which increases the force of contraction of heart and increases the heart rate or cardiac output

➤ **Triterpenoids**

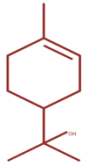

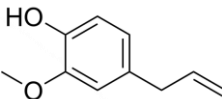
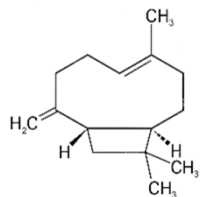
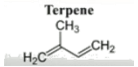

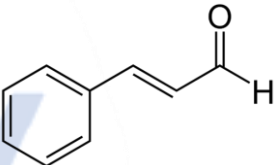
- Triterpenes are composed of three terpene unit or consisting of 6 isoprene unit with molecular formula C₃₀H₄₅, based on chemical nature they are cyclic, tetracyclic, pentacyclic & hexacyclic.

Chemistry	Plant	Introduction	Source	Chemical composition	Uses	Structure
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<p>Oleandane derivative</p>	<p>Liquorice</p> 	<p>Mulethi Family- Leguminosae</p>	<p>Glycyrrhiza glabra linn.</p>	<p>glycyrrhizic acid, carbenoxolone</p>	<p>Cough Anti-inflammatory</p>	 <p style="text-align: center;">Carbenoxolone</p>
<p>Saponin</p>	<p>Dioscorea</p> 	<p>singli-mingli Family- Dioscoreaceae</p>	<p>dioscorea deltoidea</p>	<p>Diosgenin, dioscin</p>	<p>Asthma fungal infections</p>	 <p style="text-align: center;">Dioscin</p> <p style="text-align: center;">Allantoin</p> <p style="text-align: center;">Diosgenin</p>
<p>Cardenolides</p>	<p>Digitalis</p> 	<p>foxglove Leaves Family- Scrophulariaceae</p>	<p>digitalis purpurea</p>	<p>Digitoxin, digoxin</p>	<p>CHF</p>	

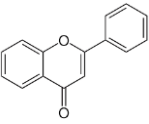

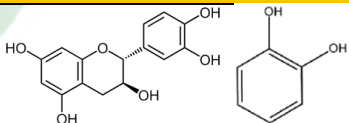
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Terpenoids 	Clove 	Clove buds Family- Myrtaceae	Eugenia caryophyllus Thumb	Eugenol Caryophyllin	Antiseptic anticancer	 Eugenol	 Caryophylline
Terpenes <small>Terpene</small> 	Cinnamon 	Dalchini Family- Lauraceae	Cinnamomum zeylanicum Nees.	cinnamic aldehyde	Analgesic Antiseptic	 cinnamic aldehyde	

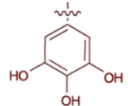

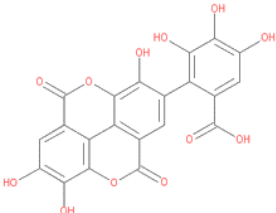
TANNINS

➤ Tannins-

- They are naturally occurring non nitrogenous compound.
- Tannins commonly referred to as tannic acid are water soluble polyphenol that are present in many plant food.
- Used as antidote ,antiseptic .astringent and anticancer.
- Tannins are dark brown or reddish Brown.
- They have antioxidant property due to presence of polyhydroxy phenolic compound.

Chemistry	Plant	Introduction	Source	Chemical composition	Uses	Structure
Flavonoids 	Catechu 	Katha, Family Leguminosae	acacia catechu.	catechin, catechol	cough and diarrhoea	 Catechin Catechol

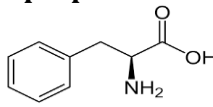

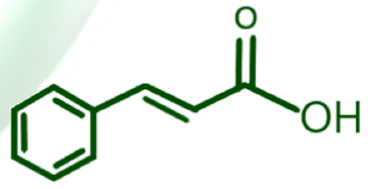
B. PHARMA 5TH SEM | PHARMACOGNOSY & PHYTOCHEMISTRY-II

Tannins 	Pterocarpus 	Family- Leguminosae	pterocarpus marsupium Linn.	kinotannic acid,	Astringent Diarrhoea	 kinotannic acid
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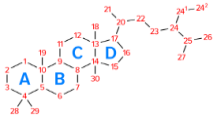

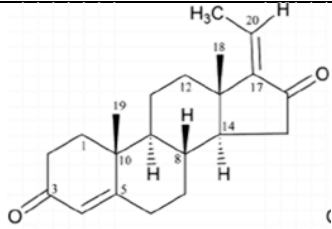
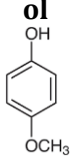

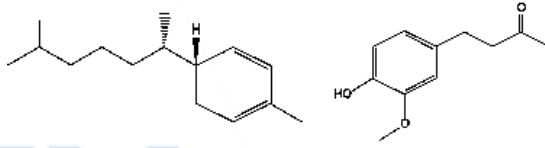
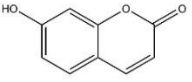

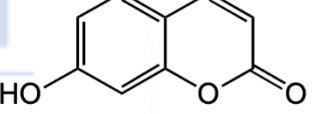
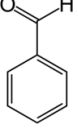

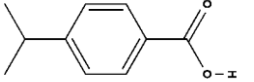
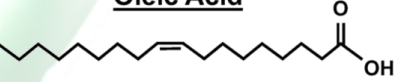
RESINS

➤ Resins

- Resin are amorphous compounds.
- They are simply extraction of plant material and are taken from the whole plant or from any specific part of plants such as bark flower etc.
- Most of the resins are heavier than water. They are insoluble in water, but soluble in alcohol, volatile oil.
- They become harder when exposed to air.
- Uses: expectorants, antiseptic, carminative, Stomachics, Anti-inflammatory agents, Anti-rheumatic agents, Flavoring agents Cathartic.

Chemistry	Plant	Introduction	Source	Chemical composition	Uses	Structure
Phenyl propanoids 	Benzoin 	Loban Family- Styracaceae	Styrax benzoin Dryander	Cinnamic acid	Antiseptic respiratory tract infection	 Cinnamic acid

B. PHARMA 5TH SEM | PHARMACOGNOSY & PHYTOCHEMISTRY-II

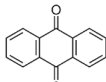

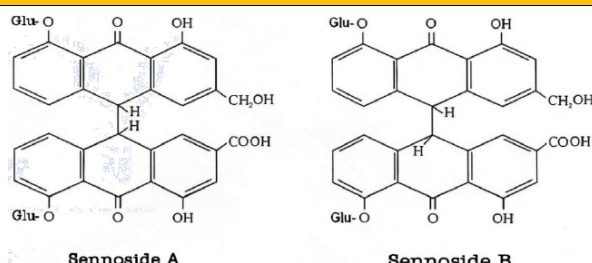
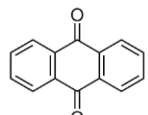

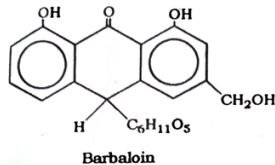

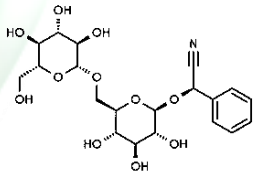
Phytosterols 	Guggul 	Gum guggul Family- Burseraceae	Commiphora weightii	E- Guggulsterone	Anti - rheumatic, expectorant	 E-guggulsterone
Methoxyphen ol 	Ginger 	Zingiber Family- Zingiberaceae	zingiber officinale	zingiberene, Zingerone	motion sickness.	 Zingiberene & Zingerone
7-hydroxy coumarins. 	Asafoetida 	devil's dung Family- Umbelliferae	Ferula asafoetida	Umbelliferone	Anti- spasmodic	
Benzaldehyde 	Myrrh 	Gum myrrh Family- Burseraceae	Commiphora mormol Engler	Cuminic aldehydes,	Antiseptic	 Cuminic aldehydes
Terpenes	Colophony	gum - resin Family- Pinaceae	pinus	oleic acid	plasters and ointment	 Oleic Acid

GLYCOSIDES

B. PHARMA 5TH SEM | PHARMACOGNOSY & PHYTOCHEMISTRY-II

➤ Glycosides

- These are organic compound obtained from plant and animal source.
- Which on enzymatic or acid hydrolysis give one or more sugar moieties along with nonsugar moiety. The former is called as glycone and the later as aglycones or genin.
- Basically all type of glycosidal linkages are occurred by interaction of -OH group of glycone and hydrogen coming through any of the radicals like CH, -OH, -SH and -NH present on aglycones part.
- They have cardiotoxic, analgesics, anti-rheumatics, anti-ulcer properties.

Chemistry	Plant	Introduction	Source	Chemical composition	Uses	Structure
Anthraquinone 	Senna 	Senna leaf Family- Leguminosae	cassia angustifolia	Sennosides A, B, C, D	Laxative irritable bowel syndrome	 <p style="text-align: center;">Sennoside A Sennoside B</p>
Anthraquinone 	Aloes 	Mussabbar Family- Liliaceae	the leaves of various species of aloe.	Barbaloin	antibacterial activity. Liver disease	 <p style="text-align: center;">Barbaloin</p>
Cyanophore	Bitter Almond 	Amygdala amara Family- Rosaceae	prunus amygdalus	Amygdalin	teeth and bone stronger constipation	 <p style="text-align: center;">amygdalin</p>

IRIDIODS, OTHER TERPENOIDS & NAPHTHOQUINONES

B. PHARMA 5TH SEM | PHARMACOGNOSY & PHYTOCHEMISTRY-II

➤ Iridoids

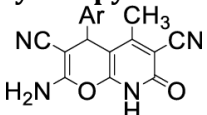

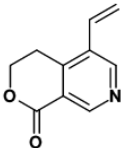
- Iridoids are a class of secondary metabolites found in wide variety of plant and some animal.
- Iridoids are a large group of monoterpenoids (C₁₀H₁₆).
- They are characterized by skeleton in which a 6-membered ring, having a oxygen atom is attached to cyclopentane ring.
- These are natural esterified products and are common in plants of lamiaceae, Gentianaceae.
- These compounds are oxygen rich.
- Medicinal property are anticancer, antitumor, antiviral, anti-inflammatory.

➤ Terpenoids


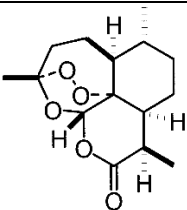
- Terpenes are hydrocarbons, and components of resins and also terpenite produced from resin.
- Word terpene is derived from terpenite
- When terpene are modified chemically such as by oxidation or rearrangement of carbon skeleton, the resulting compound are known as terpenoids.
- In 1887, Wallach produced isoprene rule that help in illustrating the chemistry of terpenoids.

➤ Naphthoquinones

- Naphthoquinones are class of organic compounds derived from naphthalene is naphthoquinones.
- They are found in plant microorganism and some animals.
- It is insoluble in cold water, slightly soluble in petroleum ether.
- It produces a reddish-brown color in alkaline solution.
- Higher plants , fungi produces naphthoquinones & they have important biological actions such as fungicidal, anti-carcinogenic, antibacterial.

Chemistry	Plant	Introduction	Source	Chemical composition	Uses	Structure
<p>Pyranopyridine</p>  <p style="text-align: center;">287</p>	<p>Gentian</p> 	<p>Gentian root</p> <p>Family- Gentianaceae</p>	<p>Gentiana lutea</p>	<p>Gentiopicrin</p> <p>Gentianine</p>	<p>Antiseptic,</p> <p>Anti-inflammatory</p>	 <p style="text-align: center;">Gentianine</p>

B. PHARMA 5TH SEM | PHARMACOGNOSY & PHYTOCHEMISTRY-II

Sesquiterpene	Artemisia 	Santonica Family- Asteraceae	artemisia	Santonin artemisinin	Hookworms and tapeworms	 1, Artemisinin
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PHARMACY





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