

Part-III

Steroids, Cardiac Glycosides & Triterpenoids

Liquorice, Dioscorea, Digitalis

Presented By;-

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Steroids, Cardiac Glycosides & Triterpenoids

S.NO	Parameter	Steroids	Cardiac Glycosides	Triterpenoids
1	Definition	Naturally occurring compounds with a cyclopentanoperhydrophenanthrene (CPP) nucleus consisting of four fused rings.	Steroidal glycosides that increase the force of heart contraction by inhibiting the Na ⁺ /K ⁺ -ATPase enzyme.	Natural compounds containing 30 carbon atoms formed from six isoprene units via the squalene pathway.
2	Major Plant Sources	Dioscorea spp., Withania somnifera, Solanum spp.	Digitalis purpurea, Digitalis lanata, Strophanthus gratus, Nerium oleander	Centella asiatica, Glycyrrhiza glabra, Boswellia serrata, Terminalia arjuna
3	Major Active Constituents	Diosgenin, β -Sitosterol, Stigmasterol, Campesterol, Withanolides	Digoxin, Digitoxin, Ouabain, Lanatoside C, Oleandrin	Asiaticoside, Madecassoside, Glycyrrhizin, Boswellic acid, Ursolic acid, Oleanolic acid
4	Pharmacological Activities	Anti-inflammatory, anticancer, immunomodulatory, cholesterol-lowering	Positive inotropic, antiarrhythmic, cardiotonic	Anti-inflammatory, antioxidant, hepatoprotective, wound healing, anticancer, antiviral
5	Therapeutic Uses	Steroid hormone synthesis, inflammation, hypercholesterolemia, adaptogenic activity	Congestive heart failure, atrial fibrillation, atrial flutter	Arthritis, liver disorders, wound healing, skin diseases, ulcers
6	Examples of Drugs/Products	Diosgenin, β -Sitosterol tablets, Ashwagandha capsules	Lanoxin® (Digoxin), Digitoxin tablets, Lanatoside C injection	Shallaki capsules, Glycyrrhizin tablets, Centella cream

Liquorice



Liquorice

Liquorice is the dried root and stolon of *Glycyrrhiza glabra* (Family: Fabaceae). It is a sweet medicinal herb used for cough, gastric ulcers, inflammation, and as a natural sweetening agent.

Biosource

- 1) **Biological Source :-** *Glycyrrhiza glabra* L.
- 2) **Family :-** Fabaceae
- 3) **Common Names :-** Liquorice, Licorice, Mulethi
- 4) **Part Used :-** Roots and underground stolons
- 5) **Geographical Sources :-** India (Punjab, Haryana, Rajasthan), Mediterranean countries, Southern Europe, Iran, Iraq, Afghanistan, China, Russia, Turkey



Chemical Constituents

Glycyrrhizin is the **major bioactive constituent** of liquorice and is responsible for its characteristic sweet taste and many of its pharmacological effects.

Important Active Constituents

1. **Glycyrrhizin (Glycyrrhizic acid)** – Principal active constituent
2. **Glycyrrhetic acid**
3. **Glabridin**
4. **Liquiritin**
5. **Liquiritigenin**
6. **Isoliquiritigenin**
7. **Licochalcone A**



Therapeutic Uses

- 1. **Anti-ulcer** – Protects the stomach lining and helps treat gastric and duodenal ulcers.
- 2. **Expectorant** – Relieves cough, sore throat and helps remove mucus from the respiratory tract.
- 3. **Anti-inflammatory** – Reduces inflammation and is useful in arthritis and inflammatory conditions.
- 4. **Hepatoprotective** – Protects the liver from damage and supports healthy liver function.
- 5. **Antiviral and Antimicrobial** – Helps fight certain viruses and microorganisms.

Commercial Applications

S.NO	Commercial Product	Active Constituent(s)	Use/Application
1	Cough syrups	Glycyrrhizin, Liquiritin	Relief from cough and sore throat
2	Throat lozenges	Glycyrrhizin	Soothes throat irritation and hoarseness
3	Anti-ulcer tablets/capsules	Glycyrrhizin, Glycyrrhetic acid	Treatment of gastric and duodenal ulcers
4	Herbal teas	Glycyrrhizin, Flavonoids	Digestive health and immunity support
5	Herbal supplements	Glycyrrhizin, Glabridin	Antioxidant, liver protection, immune support
6	Confectionery (candies)	Glycyrrhizin	Natural sweetener and flavoring agent
7	Chewing gum	Glycyrrhizin	Flavoring and freshens breath
8	Cosmetics (creams, lotions, serums)	Glabridin, Liquiritin	Skin brightening, anti-inflammatory, anti-aging
9	Toothpaste and mouthwash	Glycyrrhizin	Oral hygiene and antimicrobial action
10	Tobacco and beverages	Glycyrrhizin	Natural flavoring and sweetening agent

Dioscorea



Dioscorea

Dioscorea is the **dried tuber or rhizome of Dioscorea species** (mainly *Dioscorea floribunda*, *Dioscorea deltoidea*, and *Dioscorea villosa*) belonging to the **family Dioscoreaceae**. It is a rich source of the steroidal saponin **diosgenin**, which is widely used in the manufacture of **steroidal drugs** such as corticosteroids and oral contraceptives.

Biosource

1. **Biological Source** ;- *Dioscorea floribunda*, *Dioscorea deltoidea*, and *Dioscorea villosa*
2. **Family** :- Dioscoreaceae
3. **Part Used** :- Tuber and Rhizome
4. **Geographical Sources** :- India, Mexico, China, Nepal, Central and South America

Chemical Constituents

1. **Diosgenin** (Principal active constituent)
2. **Dioscin**
3. **Yamogenin**
4. **Tigogenin**
5. **β -Sitosterol**

Commercial Applications

S.NO	Commercial Product	Active Constituent(s)	Use/Application
1	Steroid drug intermediates	Diosgenin	Manufacture of corticosteroids
2	Oral contraceptive drugs	Diosgenin	Production of contraceptive hormones
3	Hormone replacement medicines	Diosgenin	Steroid hormone synthesis
4	Herbal capsules/tablets	Diosgenin	Joint health and anti-inflammatory support
5	Ayurvedic/Herbal formulations	Dioscin, Diosgenin	General wellness and women's health



Therapeutic Uses

1. **Precursor for steroid drugs** (corticosteroids, oral contraceptives, sex hormones).
2. **Anti-inflammatory** – Helps reduce inflammation.
3. **Antispasmodic** – Relieves muscle spasms and menstrual cramps.
4. **Anti-arthritic** – Used in joint pain and arthritis.
5. **Antioxidant** – Protects cells from oxidative damage.

Digitalis



Digitalis

Digitalis is the dried leaves of *Digitalis purpurea* L. and *Digitalis lanata* Ehrh., belonging to the family Plantaginaceae (formerly Scrophulariaceae). It is an important medicinal plant because it contains cardiac glycosides, which are used in the treatment of congestive heart failure and certain cardiac arrhythmias.

Biosource

1. **Biological Source :-** *Digitalis purpurea* and *Digitalis lanata*
2. **Family :-** Plantaginaceae
3. **Part Used :-** Leaves
4. **Geographical Sources :-** Europe, United Kingdom, Germany, France, India (cultivated), USA

Chemical Constituents

1. Digoxin
2. Digitoxin
3. Lanatoside C
4. Gitoxin
5. Gitalin

Commercial Applications

S.NO	Commercial Product	Active Constituent(s)	Use/Application
1	Digoxin tablets	Digoxin	Congestive heart failure, atrial fibrillation
2	Digoxin injection	Digoxin	Emergency management of heart failure and arrhythmias
3	Digitoxin tablets	Digitoxin	Heart failure and cardiac arrhythmias
4	Lanatoside C preparations	Lanatoside C	Management of cardiac disorders
5	Cardiac glycoside formulations	Digoxin, Digitoxin	Treatment of heart diseases



Therapeutic Uses

1. Treats congestive heart failure (CHF).
2. Controls atrial fibrillation and atrial flutter.
3. Improves the force of heart contraction (positive inotropic effect).
4. Slows the heart rate in certain arrhythmias.
5. Improves cardiac output in patients with heart disease.



Thank you

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