

CARDIOTONICS

Cardiotonics (Greek Kardia - heart) are the drugs which give strength or energy to the activity of the heart. The cardiotonics increase the force of contraction of cardiac muscles and stimulate the overall activity of the heart. Digitalis, strophanthus, squill, thevetia and arjuna bark are the examples of cardio tonic natural drugs,

DIGITALIS

Synonyms: Digitalis leaves, Foxglove leaves

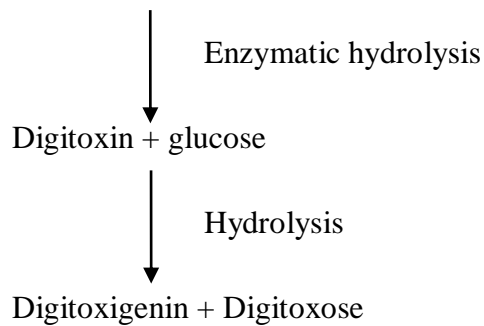
Biological Source: Digitalis consists of dried leaves of *Digitalis purpurea* (Scrophulariaceae), dried at a temperature below 60 °C, immediately after collecting the leaves. The leaves should contain not more than 5% of moisture.

Geographical distribution: It is cultivated and collected in England, other parts of Europe, United States and India. In India, it is cultivated to a limited extent in Kashmir.

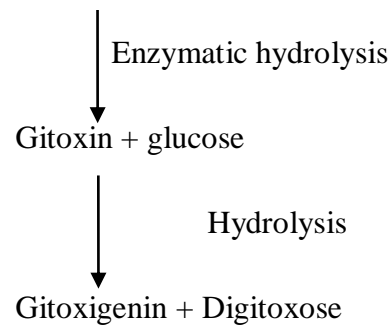
Chemical Constituents:

- Digitalis contains 0.2 to 0.45 % mixture of cardiac glycosides (cardenolides), purpurea glycosides A and B. which are primary glycosides.
- Digitalis also contains several other glycosides such as odorside H, glucogitaloxin, gitaloxin, verodoxin, and glucoverodoxin.
- The products of hydrolysis of purpurea glycoside A and purpurea glycoside B. The chief active constituents of the drug are as under.

Purpurea glycoside A



Purpurea glycoside B



- Additionally, it contains 2 saponin glycosides, viz. digitonin and gitonin. The total number of glycosides reported in drug is about 30.
- Apart from glycosides, leaves also contain hydrolytic enzymes.
- Digitalis and its official preparations like prepared digitalis, digitalis tablets, digitalis tincture etc. are assayed biologically.

Chemical Test:

Keller-Killiani test for digitoxose:

- The test consists of boiling about one gram finely powdered digitalis with 10 ml of 70% alcohol for 3 minutes. The extract is filtered.
- To the filtrate is added, 5 ml of water and 0.5 ml of strong solution of lead acetate, filtered and filtrate is treated with equal volume of chloroform and evaporated to yield extract.
- The extractive is dissolved in glacial acetic acid and after cooling, 2 drops of ferric chloride solution are added to it.
- These contents are transferred to a test tube containing 2 ml of concentrated sulphuric acid.
- A reddish brown layer acquiring bluish-green colour after standing is observed due to presence of digitoxose.

Uses

- Digitalis increases excitability of cardiac muscles and produces more powerful contractions.

- It is effective in congestive cardiac failure to increase cardiac output and to relieve venous congestion. Hence, it is described as a cardiac tonic.
- The improvement of circulation through kidney results in diuresis and loss of oedema.
- The major disadvantage of digitalis is that it has cumulative effect and therefore, in prolonged treatment one has to watch the patient carefully.

ARJUNA

Synonym: Arjun bark

Biological Source: Arjuna consists of dried stem bark of the plant known as *Terminalia arjuna* Rob, belonging to family Combretaceae. It contains less than 0.02% of arjungenin on dried basis.

Geographical Distribution: The tree is common in Indian peninsula. It is distributed throughout the beaches of streams and very common in Chhota-Nagpur and also in Dehradun.

Chemical Constituents:

- Arjuna contains about 15 % of tannins (hydrolysable and condensed).
- It also contains triterpenoid saponins, arjunolic acid, arjunic acid, arjungenin.
- In addition, it contains β -sitosterol, ellagic acid and arjunic acid.
- The crystallisable compounds reported are arjunine and arjunetine. Calcium, aluminium and magnesium salts along with colouring matter and sugar are the other constituents of arjuna.

Chemical Test:

The ethereal extract of arjuna shows pinkish fluorescence under ultra-violet light, (while *Terminalia tomentosa* gives pale blue).

Uses:

Arjuna bark is used as a cardiogenic. It is also styptic, febrifugal and antidysenteric. It possesses diuretic and tonic properties. Arjuna bark is used extensively in tanneries and also as timber.