

5.1. LAXATIVES

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5.1.1. Introduction

Laxatives are used for curing acute and chronic constipation, treating anorectal disorders (haemorrhoids), and preparing the bowel for colonoscopy. Although constipation affects all age group individuals, it especially affects the pregnant women and elderly individuals. Constipation is mostly treated by modifying diet. Laxatives are the well-known, highly advertised, and commonly used OTC drugs, which exert a therapeutic effect on the GIT. Conventionally, these drugs were classified as stimulant/irritant, saline and osmotic cathartics, bulk-forming agents, stool softeners, and lubricants.

5.1.2. Aloes

Aloe vera is a plant (figure 5.1) species of the *Aloe* genus. It grows wildy in tropical climates and is also cultivated due to its agricultural and medicinal values.

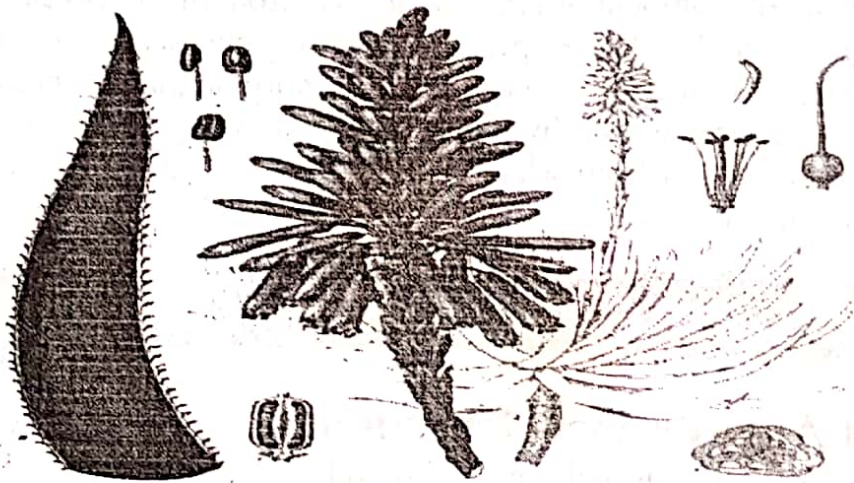


Figure 5.1: Aloe Plant

Synonyms

Mussabar, Kumari, and Aloes.

Biological Source

Aloe vera is the dried juice obtained from the leaves of various species of aloe like *Aloe perryi* Baker (Scotorine aloe), *Aloe vera* Linn., (Curacao aloe), and *Aloe africana* (Cape aloe).

It is one of the most familiar of all the medicinal herbs. Out of the more than three hundred species of aloe, only four are believed to have medicinal properties. The most potent medicinal effects are believed to come from aloe vera (also called *Aloe barbadensis*), which is frequently produced in gel form.

Family

Liliaceae

5.1.2.1. Occurrence and Distribution

Curacao, Barbados, and Aruba: Curacao aloes or Barbados aloes and Bonaire (West Indian Islands).

Cape Town (South Africa): Cape aloes.

Socotra and Zanzibar Islands: Socotrine or Zanzibar aloes.

Aloe vera is also cultivated in Europe and the North West Himalayan region in India.

5.1.2.2. Organoleptic Evaluation

The organoleptic features of aloe vera are:

- 1) **Curacao Aloes:** It is usually opaque and varies in colour from bright yellowish or rich reddish brown to black. Sometimes it is vitreous and small fragments are of deep garnet-red colour and transparent, then it is known as **Capey Barbados** and is less valuable, but may become opaque and more valuable on storing. Curacao aloes possesses the nauseous and bitter taste that is characteristic of all aloes and a disagreeable, penetrating odour. It is almost entirely soluble in 60% of alcohol and contains not more than 30% of the substances insoluble in water and 12% of moisture. It should not yield more than 3% of ash. Its fracture is waxy.
- 2) **Socotrine Aloes:** It may be distinguished principally from Curacao aloes by its different odour. Much of the dry drug is characterised by the presence of small cavities in the fractured surface; it is yellow-brown to dark-brown in colour and opaque. Fracture is irregular and porous, and taste is bitter.
- 3) **Cape Aloes:** It forms dark coloured masses which break with a clean glassy fracture and exhibit in their splinters a yellowish, reddish-brown, or greenish tinge. Its translucent and glossy appearance is very characteristic and red-currant like odour sufficiently distinguishes it from all other varieties of aloes.

5.1.2.3. Chemical Constituents

Aloe is made up of 30% of **aloin** which is a mixture of **barbaloin**, **β -barbaloin**, and **isobarbaloin** isomers. Barbaloin is a crystalline glycoside which is present in all the four varieties of aloe and is slightly yellow coloured, bitter in taste, and water-soluble. Barbaloin is a C-glycoside compared to common O-glycosides.

β -Barbaloin is amorphous in nature and is present in Cape aloe. It can be obtained by heating barbaloin. Isobarbaloin exists in crystalline form and is present in Curacao and Cape aloe (in trace amounts), but absent in Socotrine and Zanzibar aloe. It is a mixture of barbaloin and polyphenols (responsible for its colour tests).

Aloinsides A and B, O-glycosides of aloin in which L-rhamnose is combined with -OH of hydroxymethyl group at C-11 atom are also present in aloe. **Aloe-emodin anthrone** and **glucose** are the hydrolysis products of barbaloin. **Aloe-emodin anthranol** and **aloe-emodin** are also present in aloes. It also contains a resin which is an ester of *p*-coumaric acid or *p*-hydroxy cinnamic acid esterified with aloeresinotannol.

5.1.2.4. Chemical Tests

Aloe vera can be identified by the following chemical tests:

- 1) **Schonteten's Test:** An aqueous solution (5ml) of aloe is added with borax (0.2gm) and heated to dissolve completely. Few drops of the resultant are poured in a test tube filled with water. A green fluorescence is produced.
- 2) **Bromine Test:** A pale yellow precipitate of tetrabromaloin is formed on adding bromine to aqueous solution of aloe.

- 3) **Nitric Acid Test:** An aqueous solution (5ml) of aloe is added with nitric acid (2ml), Cape aloe forms a brown colour which changes rapidly to green, Curacao gives a deep brownish-red colour, Socotrine gives a pale brownish-yellow colour, and Zanzibar gives a yellow-brown colour.
- 4) **Nitrous Acid Test:** An aqueous solution of aloe is added with a small amount of sodium nitrite and a few ml of acetic acid. Pink colour is developed.
- 5) **Klunge's Isobarbaloin Test:** An aqueous solution (20ml) of aloe is added with a drop of copper sulphate solution followed by sodium chloride (1gm) and 90% alcohol (1ml). A purple colour develops due to the presence of isobarbaloin. This test is sensitive to Curacao aloe.
- 6) **Modified Anthraquinone or Modified Borntrager's or Cupraloin Test:** 0.1gm of aloe is boiled with dilute HCl and 5ml of 5% solution of FeCl_3 for 5 minutes. The resultant solution is cooled, filtered, and the filtrate is shaken with benzene. The benzene layer is separated. Ammonia solution is added to the resultant mixture producing a pink colouration.

5.1.2.5. Therapeutic Efficacy

Aloe vera has the following therapeutic properties:

- 1) Its gel is stabilised and added with a preservative to be used in the form of pure gel or applied as a lotion.
- 2) Its gel is effectively used in stomach and mouth ulcers.
- 3) Its gel is also helpful in treating burns and aiding wound healing.
- 4) Ointment of aloe gel is used in the treatment of skin irritations, burns caused by sun, heat or radiation.
- 5) Enzymes obtained by extracting its gel possess analgesic properties, and have shown to inhibit thermal damage and vascular permeability in mice.
- 6) It shows antibacterial, anti-inflammatory, emollient, and moisturising effects, thus can be used dermatologically.
- 7) It is used as a purgative because of its intensely irritating effects on the delicate mucosal lining.
- 8) It contains polysaccharides which serve as soothing and immunostimulating agents.
- 9) It contains anthraquinone derivatives which show antibacterial property.
- 10) It is one of the ingredients of compound Benzoin Tincture in which it is a pharmaceutical adjunct.
- 11) Its fresh leaf pulp has antioxidant property.
- 12) Its cream effectively reduces the clinical symptoms of psoriasis and UV-induced erythema.

5.1.3. Rhubarb

Rhubarb is used in the traditional Chinese therapy. It is commonly used as laxative and as a bitter stomachic. Out of 60 species of *Rheum*, 40 are Chinese among which minimum 18 are medicinally important.

Synonyms

China rhubarb, Turkey rhubarb, and East Indian rhubarb.

Biological Source

Rhubarb is the peeled dried rhizomes and roots of *Rheum palmatum* Linn.

Family

Polygonaceae

5.1.3.1. Occurrence and Distribution

Rhubarb grows wild as well as it is cultivated in Tibet, South East China, Southern Siberia, and North America. It is also grown in Germany and several European countries. In India, it covers Kashmir, Kullu, Sikkim, Uttar Pradesh, and Punjab. It is also cultivated in Nepal.

5.1.3.2. Organoleptic Evaluation

The organoleptic features of rhubarb are:

- 1) **Size:** 6-10 feet.
- 2) **Odour:** Characteristic.
- 3) **Taste:** Astringent and nauseous.
- 4) **Colour:** Externally brown and internally deep yellow coloured.
- 5) **Shape:** Root is thick, oval shaped, sending off long, tapering branches; stem is erect, round, hollow, jointed, and branched towards the top.

This species is distinguished from other Rhubarbs by its much larger size, shape of leaves, with their oblong, sharpest segments, and graceful looseness of its little panicles of greenish-white flowers. The first buds which appear in spring, are yellow coloured.

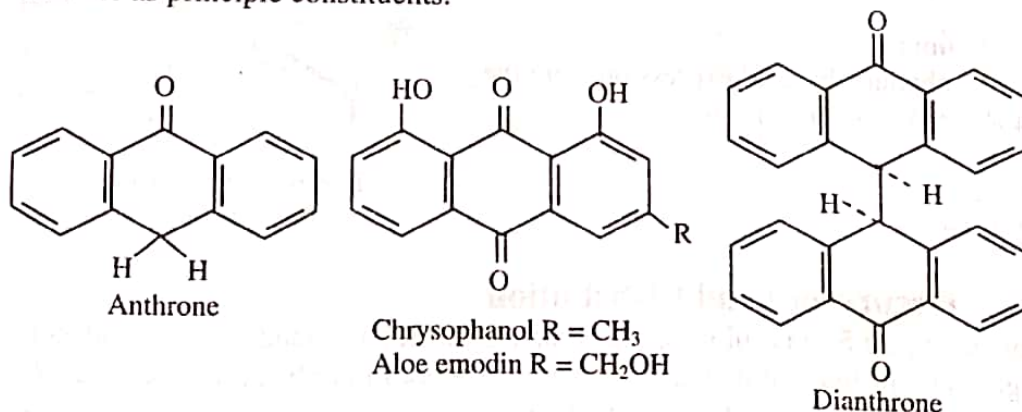


Figure 5.2: Twig of *Rheum Palmatum*

Chinese or Turkey Rhubarb occurs commercially in brownish-yellow pieces of various sizes, usually perforated, the holes often containing a portion of the cord used to hang the sections of the root during drying. The outer surface is generally powdery (the bark having been removed) and shows a network of white lines. The taste is astringent and nauseous, and there is a characteristic odour.

5.1.3.3. Chemical Constituents

Rhubarb contains free anthraquinone glycosides (2-4.6%). It also contains anthraquinones of **aloe-emodin**, **emodin**, **chrysophanol**, **rhein**, **anthrone**, and **dianthrone** as principle constituents.



5.1.3.4. Chemical Tests

Rhubarb gives the following chemical tests:

- 1) **For Presence of Anthraquinone Derivatives:** 100mg of powder is shaken with 5ml dilute H₂SO₄ in a test tube. This mixture is heated in boiling water for 2 minutes, filtered while hot, and cooled. The cooled filtrate is shaken with an equal amount of

benzene. The benzene layer is separated and half its volume of dilute ammonia solution is added to it. A pink or red colour is produced in the ammoniacal layer, indicating the presence of anthraquinone glycosides.

- 2) **Colour Reaction with Alkali:** A little amount of powdered drug is put on a white tile and added with 2 drops of KOH solution (5%). The yellow contents of the cells of the medullary rays become deep red. The test with dilute ammonia solution is repeated.
- 3) **For Presence of Tannins:** A little amount of powdered drug is put on a white tile and added with 2 drops of FeCl₃ solution. The change is observed and the test is repeated using water and compared.

5.1.3.5. Therapeutic Efficacy

Rhubarb has the following therapeutic properties:

- 1) It is used as bitter stomachic in small doses.
- 2) It is used as an antiseptic, antispasmodic, purgative, and stomachic.
- 3) Its root is used as anticholesterolemic, antiseptic, antispasmodic, anti-tumour, aperient, astringent, cholagogue, demulcent, diuretic, laxative, purgative, stomachic, and tonic.
- 4) Its roots contain anthraquinones which are purgatives; and tannins and bitters which exert an opposite astringent effect.
- 5) It acts as an astringent tonic to the digestive system in small doses; while in larger doses it act as a mild laxative.
- 6) Internally its root is helpful for treating chronic constipation, diarrhoea, liver and gall bladder complaints, haemorrhoids, menstrual problems, and skin eruptions due to toxin build-up.
- 7) Externally its root is used for treating burns.