LAXATIVES

Laxatives, **purgatives**, or **aperients** are substances that loosen stools and increase bowel movements. They are used to treat and prevent constipation(कब्ज).

❖ CONSTIPATION

Constipation is a symptom, not a disease. Most commonly, constipation is thought of as infrequent bowel movements, usually less than 3 stools per week. However, people may have other complaints as well including:

- Straining with bowel movements
- Excessive time needed to pass a bowel movement
- Hard stools
- Pain with bowel movements secondary to straining
- Abdominal pain
- Abdominal bloating.
- the sensation of incomplete bowel evacuation.
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❖ Types of laxative

i) Bulk-forming agents

Bulk-forming laxatives, also known as roughage, are substances, such as fiber in food and hydrophilic agents in over-the-counter drugs, that add bulk and water to stools so that they can pass more easily through the intestines (lower part of the digestive tract).

Properties

- Site of action: small and large intestines
- Onset of action: 12–72 hours
- Examples: dietary fiber, Metamucil(ispaghula)

ii) Dietary fiber

- **Dietary fiber** (British spelling **fibre**) or **roughage** is the portion of plant-derived food that cannot be completely broken down by human digestive enzymes.
- Dietary fiber consists of non-starch polysaccharides and other plant components such as cellulose, resistant starch, resistant dextrins, inulin, lignins, chitins (in fungi), pectins, beta-glucans, and oligosaccharides.
- Exaples-
  - → Fruits, such as bananas, though this depends on their ripeness, kiwifruits, prunes, apples (with skin), pears (with skin), and raspberries
  - → Vegetables, such as broccoli, string beans, kale, spinach, cooked winter squash, cooked taro and poi, cooked peas, and baked potatoes (with skin)
  - → Whole grains
  - → Bran products
  - → Nuts
  - → Legumes, such as beans, peas, and lentils
- Dietary fiber has two main components: soluble fiber and insoluble fiber

a) **Soluble fiber** (*fermentable fiber* or *prebiotic fiber*) –
   - ★ It dissolves in water
   - ★ It is generally fermented in the colon into gases and physiologically active by-products, such as short-chain fatty acids produced in the colon by gut bacteria.
   - ★ Examples are beta-glucans (in oats, barley, and mushrooms) and raw guar gum.
   - ★ Soluble fiber is generally viscous and delays gastric emptying which, in humans, can result in an extended feeling of fullness.
   - ★ Inulin (in chicory root), wheat dextrin, oligosaccharides, and resistant starches (in legumes and bananas), are soluble non-viscous fibers.
   - ★ Regular intake of soluble fibers, such as beta-glucans from oats or barley, has been established to lower blood levels of LDL cholesterol, a risk factor for cardiovascular diseases.

b) Insoluble fiber –
   - ★ It does not dissolve in water – is inert to digestive enzymes in the upper gastrointestinal tract.
   - ★ Examples are wheat bran, cellulose, and lignin.

iii) Emollient agents (stool softeners)

- Emollient laxatives, also known as stool softeners, are anionic surfactants that enable additional water and fats to be incorporated in the stool, making it easier for them to move through the gastrointestinal tract.
- **Properties**
  - → Site of action: small and large intestines
  - → Onset of action: 12–72 hours
  - → Examples: Docusate (Colace, Diocto), Gibs-Eze
- Emollient agents prevent constipation rather than treating long-term constipation.

iv) Lubricant agents

- Lubricant laxatives are substances that coat the stool with slippery lipids and decrease colonic absorption of water so that the stool slides through the colon more easily. Lubricant laxatives also increase the weight of stool and decrease intestinal transit time.[3]
- **Properties**
  - → Site of action: colon
  - → Onset of action: 6–8 hours
  - → Example: mineral oil
- Mineral oil is the only nonprescription lubricant. Mineral oil may decrease the absorption of fat-soluble vitamins and some minerals.

v) Hyperosmotic agents

- Hyperosmotic laxatives are substances that cause the intestines to hold more water within and create an osmotic effect that stimulates a bowel movement.[3]
- **Properties**
  - → Site of action: colon
  - → Onset of action: 12–72 hours (oral), 0.25–1 hour (rectal)
  - → Examples: glycerin suppositories (Hallens), sorbitol, lactulose, and PEG (Colyte, MiraLax)
- Lactulose works by the osmotic effect, which retains water in the colon, lowering the pH through bacterial fermentation to lactic, formic and acetic acid, and increasing colonic peristalsis.
- Glycerin suppositories work mostly by hyperosmotic action,
- Solutions of polyethylene glycol and electrolytes (sodium chloride, sodium bicarbonate, potassium chloride, and sometimes sodium sulfate) are used for whole bowel irrigation, a process designed to prepare the bowel for surgery or colonoscopy and to treat certain types of poisoning.

vi) Saline laxative agents

- Saline laxatives are non-absorbable osmotically active substances that attract and retain water in the intestinal lumen, increasing intraluminal pressure that mechanically stimulates evacuation of the bowel.
- **Properties**
  - → Site of action: small and large intestines
  - → Onset of action: 0.5–3 hours (oral), 2–15 minutes (rectal)
  - → Examples: sodium phosphate (and variants), magnesium citrate, magnesium hydroxide (milk of magnesia), and magnesium sulfate (Epsom salt)

vii) Stimulant agents

- Stimulant laxatives are substances that act on the intestinal mucosa, altering water and electrolyte secretion. They also stimulate peristaltic action
- **Properties**
  - → Site of action: colon
  - → Onset of action: 6–10 hours
  - → Examples: senna, bisacodyl

viii) Miscellaneous

- Castor oil is a glyceride that is hydrolyzed by pancreatic lipase to ricinoleic acid, which produces laxative action by an unknown mechanism.
- **Properties**
  - → Site of action: colon,small intestine
  - → Onset of action: 2–6 hours
  - → Examples: castor oil

1. **ALOE**

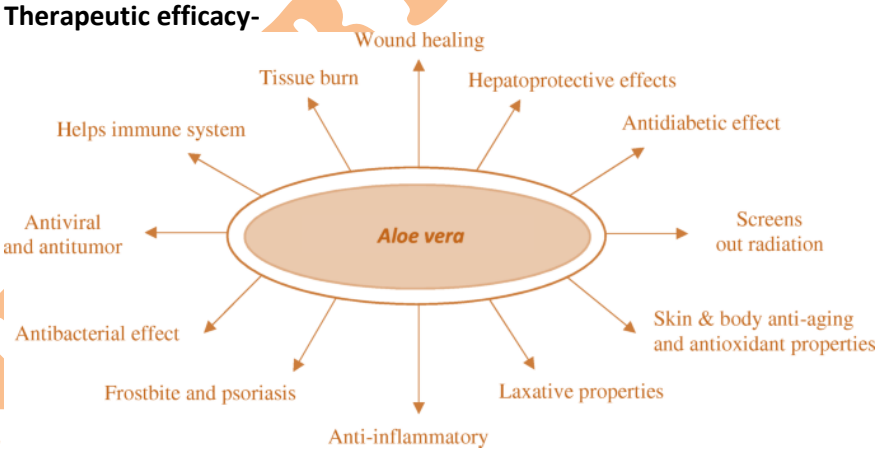
- The botanical name of Aloe vera is **Aloe barbadensis miller**. It belongs to Asphodelaceae (Liliaceae) family.
- **Synonyms**- Aloe, musabbar, Lolesara(in Kannada)
- Aloe vera is a succulent plant species of the genus *Aloe*. It containing over 560 species .
- The plant is stemless or very short-stemmed with thick, greenish, fleshy leaves that arises from the plant's central stem. The margin of the leaf is serrated(दांतेदार) with small teeth.
- **People who experience periodic constipation may use aloe vera juice as a natural laxative**. The outer portion of the plant contains compounds called anthraquinones, and these have a laxative effect. If a person is trying aloe vera juice for the first time, they may wish to start with a small serving.
- The gel from aloe vera leaves can be used topically, but should **NOT** be eaten by people or pets. It can cause unpleasant symptoms such as nausea or indigestion and may even be toxic in larger quantities.

➢ **Biological source-** The biological source of aloe is dried latex of leaves of plants *Aloe barbadensis miller* of family Asphodelaceae (Liliaceae)

➢ **Chemical constituents-**

- Anthracene glycosides
- Barbaloin or Aloin
- Isobarbaloin, aloe-emodin and aloesone
- Aloinosides A and B
- Resins (resorcinol+cinnamic acid or caumaric acid)
- Aloetic acid, homonataloin etc

➢ **Therapeutic efficacy-**



2. **CASTOR OIL(अरण्डी या अरण्ड का तेल)**

- **Castor oil** is a vegetable oil pressed from castor beans.
- It is a colourless or pale yellow liquid with a distinct taste and odor.
- **Synonyms**- Ricinus oil, oleum ricini, castor oil seed, castor bean oil etc
- It includes a mixture of triglycerides in which about 90% of fatty acids are ricinoleates. Oleic acid and linoleic acid are the other significant components.
- Castor oil and its derivatives are used in the manufacturing of soaps, lubricants, hydraulic and brake fluids, paints, dyes, coatings, inks, cold-resistant plastics, waxes and polishes, nylon, and perfumes.
- It is used as laxative effects, anti-inflammatory properties, and the ability to help induce labor.

➢ **Biological source-** it is obtained by cold expression of the seeds of *Ricinus communis* of family Euphorbiaceae

➢ **Chemical constituents-**

Acid Name	Average Range (%)
Ricinoleic acid	84.5–94
Oleic acid	3–7
Linoleic acid	1.5–6
α-Linolenic acid	0.4–1
Stearic acid	0.4–1
Palmitic acid	0.4–1
Dihydroxystearic acid	0.25–0.6
Others	0.25–0.6

➢ **Therapeutic efficacy-**

- Castor seed helps to treat rheumatism
- Castor seed helpful in inducing labour pain
- Castor seed helps in birth control
- Castor Seed good for skin care
- Castor Seed helps in reducing menstrual pain
- Castor seed reduce arthritis pain
- Castor seed treats Constipation
- It has antimicrobial properties
- Castor seed oil is good for hair growth
- Castor seed removes ringworm
- Castor seed helps in draining excessive fluids

3. ISPAGHULA (इसब्घोल की भूसी)

- **Psyllium** or **ispaghula**, is the common name used for several members of the plant genus *Plantago* whose seeds are used commercially for the production of mucilage.
- **Synonym- isapgol, isabgol**
- Psyllium is mainly used as a dietary fiber to relieve symptoms of both constipation and mild diarrhea, and occasionally as a food thickener.
- Use of psyllium in the diet for three weeks or longer often lowers blood cholesterol levels in people with elevated cholesterol, and can lower blood glucose levels in people with type 2 diabetes. Use of psyllium for a month or longer may produce a small reduction in systolic blood pressure.
- The plants from which the seeds are extracted tolerate dry and cool climates and are mainly cultivated in northern India.

➢ **Biological source-** it consist of husk of dried seed of the plant *Plantago psyllium, P. arenaria, P.ramosa,P.ovata or P.amplexicaulis* of family Plantaginaceae.

➢ **Chemical constituents-**

It contain

- Mucilage
- Pentosan and aldobionic acid
- Fixed oils
- Proteins
- Xylose, arabinose, gacturonic acid and rhamnose are the product of hydrolysis of pentosan

➢ **Therapeutic efficacy**

- Lowers blood cholesterol
- Relieves constipation
- Prevents diarrhoea
- Soothes inflammation
- Reduces diabetes
- Creates weight loss

4. SENNA

- Senna (Cassia species) is a popular herbal laxative that is available without prescription.
- Commonly used species being Cassia acutifolia (Alexandrian senna) and C. angustifolio (Indian or Tinnevelly senna).
- Extracts of the leaves, flowers and fruit of senna have been used for centuries in folk medicine as a laxative and stimulant.
- Senna is also included in several herbal teas, used for purging and in weight loss.
- The active components in senna extracts are anthraquinone derivatives and their glucosides, referred to as senna glycosides or sennosides. The sennosides are not absorbed but are hydrolyzed by colonic bacteria releasing the active moieties, rhein and rhein-anthrone which appear to act as local irritants on the colon, promoting peristalsis and evacuation
- Synonym- Tinnevelles senna, folia senna and cassia senna

➢ **Biological source-** it is dried leaflets of *Cassia angustifolia* (Indain) *Cassia acutifolia* (Alexanderian) of family Leguminosae

➢ **Chemical constituents-**

- Senna contians Anthraquinone derivatives, they are Sennoside A, Sennoside B, Sennoside C and Sennoside D.
- Sennoside C & D are minor constituents.
- Leaves also contains Rhein, Kaempferol, Aloe-emodine and Isorhamnetin.
- It also contains Phytosterol, Salicylic acid, Mucilage, resin and calcium oxalate.
- The aglycone of Sennoside is known as Sennidin, which is in dianthrone of Rhein.

➢ **Therapeutic efficacy-**

It is used as

- Strong laxative in case of acute or chronic constipation
- To produce soft stool in case of abdominal operation, anal-rectal operation, hemorrhoids, x-ray for intestine

A. CARDIOTONIC

- Drugs that increase the contractile power of the myocardium and thus enhance its capability and efficacy are called cardiotonic agents.
- Cardiac insufficiency can be defined as an inability of the heart to pump a sufficient amount of blood to supply oxygen and nutrients to organs and tissue, which leads to fatigue, shortness of breath, and edema. Cardiac insufficiency is most often caused by arterial hypertension and ischemic heart disease.
- Cardiotonic drugs increase the force of the contraction of the muscle (myocardium) of the heart. This is called a positive inotropic action.
- Inotropic agents, or inotropes, are medicines that change the force of your heart's contractions. There are 2 kinds of inotropes: positive inotropes and negative inotropes. Positive inotropes **strengthen the force of the heartbeat**. Negative inotropes weaken the force of the heartbeat.
- When the force of contraction of the myocardium is increased, the amount of blood leaving the left ventricle at the time of each contraction is increased. When the amount of blood leaving the left ventricle increases, cardiac output (the amount of blood leaving the left ventricle with each contraction) is also increased.

1. DIGITALIS

- ***Digitalis purpurea***, the **foxglove** or **common foxglove**, is a poisonous species of flowering plant in the plantain(genus) family Plantaginaceae,
- It is native to and widespread throughout most of temperate Europe. It is also naturalised in parts of North America and some other temperate regions.
- It is the original source of the heart medicine digoxin (also called digitalis or digitalin).
- This biennial plant grows as a rosette of leaves in the first year after sowing, before flowering and then dying in the second year (i.e. it is monocarpic).
- Synonym- foxglove leaves, digitalis leaves

➢ **Biological source-** it is obtained from the dried leaves of *Digitalis purpurea* belonging to family Scrophulariaceae.

➢ **Chemical constituents**

- It contains 35 glycosides.
- The primary glycosides are : Purpurea A, Purpurea B, Odoroside H.
- The digitoxigenin, digitoxin, gitoxigenin, gitaloxin are important medicinal compounds. They are also called secondary glycosides.
- They also contain anthraquinone derivatives, saponin, flavonoid, tannin and pectin.

- **Therpeuatic efficacy**
  - It increase the force of the contraction of the muscle (myocardium) of the heart
  - It is used to treat congestive heart failure (CHF) and heart rhythm problems (atrial arrhythmias).
  - It can **increase blood flow throughout your body and reduce swelling in your hands and ankles**.
  - It has a good effect on kidney which results in diuresis and loss of oedema.
  - It has cardiotinic property.
  - It is also used to treat arterial flutter and atrial fibrillation.

2. ARJUNA

- ***Terminalia arjuna*** is a tree of the genus *Terminalia*. It is commonly known as **arjuna** or **arjun tree** in English.
- Its bark is thick, grey to pinkish green, smooth, thin, coming off in irregular sheets
- It belongs to the family of Combretaceae.
- Its bark decoction is being used in the Indian subcontinent for anginal pain, hypertension, congestive heart failure, and dyslipidemia
- Synonym- Arjun bark, arjun

- **Biological source-** it is obtained from dried bark of *Terminalia arjuna* of family Combretaceae
- **Chemical constituents-**

It contains

- Tannins
- Triterpenoid saponins
- Arjunolic acid
- Arjunic acid
- Arjunogenin
- Flavonoids- Arjunetin, Arjunolone, Arjunone

- **Therapeutic efficacy**
  - It is used as a heart tonic
  - It strengthen the heart muscle
  - Help in maintaining normal blood pressure
  - Help in maintaining normal cholesterol level
  - Also used to treat dysentery and ear ache
  - It is also used to treat asthmatic condition

B. ANTI TUSSIVE

- Antitussives are **drugs that suppress coughing, also known as cough suppressants**.
- Cough(खांसी)
  - → It is a normal and vital respiratory reflex which protects the airway from aspiration of food and fluid
  - → Abolition or severe inhibition of this reflex would be life threatening.
  - → Acute cough is a common symptom associated with common cold and flu and is caused by hypersensitivity of the cough reflex, so cough occurs spontaneously or in response to stimuli such as cold air
- Antitussives are thought to work by inhibiting a coordinating region for coughing located in the brain stem, disrupting the cough reflex arc; although the exact mechanism of action is unknown.

1. **VASAKA**

- Vasaka also known as 'Malabar Nut' in English, 'Adhathodai' in Tamil, 'Vasa' in Telugu and 'Arusha' in Hindi, is a potent ayurvedic plant that enhances the respiratory system.
- It is used for breathing trouble, cough, and cold, nasal congestion, sore throat, asthma, bronchitis, other upper respiratory tract infections, bleeding disorders, etc.

➢ **Biological source**

It obtained from fresh or dried leaves of *Adhtoda vasica* of family Acanthaceae

➢ **Chemical constituents**

- Vasaka contains Quinazoline alkaloids
- Main alkaloids are Vasicine, Vasicinone, 6-hydroxy Vasicine
- Leaves contain Volatile oil, Betain & Vasakin

➢ **Therapeutic efficacy**

2. **TOLU BALSAM**



- **Tolu balsam** or **balsam of Tolu** is a balsam(resinous exudates)
- It is similar to the balsam of Peru.
- It is tapped from the living trunks of *Myroxylon balsamum.*
- The fresh balsam of Tolu is a brownish, sticky, semifluid mass. It gradually becomes a brittle solid, but softens again when it is warm.
- The balsam contains a fairly large amount of benzyl and cinnamyl esters of benzoic and cinnamic acid (benzyl benzoate, benzyl cinnamate).

➢ **Biological source**

Resin obtained from the incision of trunk of *Myroxylon balsamum* or *Myroxylan toluifera* of family Leguminosae

➢ **Chemical constituents**

Major constituents:
Resin(80%): free Cinnamic acid
(contains) free Benzoic acid
Resin alcohols combined with acids
Toluresinotannol
Tolu balsam oil: composed of
Phellandrene
Benzyl benzoate
Benzyl cinnamate
Vanillin
Eugenol

➢ **Therapeutic efficacy**

- It used for
  - → **cough,**
  - → **bronchitis,**
  - → **swollen airways,**
  - → **and cancer**.
- It is applied directly to the skin to treat
  - → bedsores,
  - → cracked nipples,
  - → cracked lips,
  - → minor skin cuts.

CARMINATIVE AND GI REGULATORS

- **CARMINATIVE**
  - A **carminative**, also known as **carminativum** (plural **carminativa**)
  - It is a herb or preparation to prevent the formation of gas in the gastrointestinal tract or facilitate the expulsion of said gas, thereby prevent flatulence(पाद)
- **FLATULENCE**
  - Gas or "intestinal gas" means different things to different people. Everyone has gas and eliminates it by belching(डकार) or passing it through the rectum, medically referred to as flatulence (farting or पाद)
- **BELCHING**
  - The ability to belch is almost universal. Belching, also known as burping, is the act of expelling gas from the stomach out through the mouth.
  - The usual cause of belching is a distended (inflated or फूला हुआ) stomach caused by swallowed air.
  - The distention of the stomach causes abdominal discomfort, and the belching expels the air and relieves the discomfort.
  - The common reasons for swallowing large amounts of air (aerophagia) are gulping(गटकना) food or drink too rapidly, anxiety, and carbonated beverages
- **FUNCTION OF GASTRO-INTESTINAL TRACT (G.I. TRACT)**
  - The gastrointestinal tract is a tube like structure which extends from the mouth to the anus
  - It supplies nutrients, electrolytes and water to the various body systems, including itself, through performing five functions.
  - These five functions include digestion, secretion, absorption, storage and excretion.
  - G.I regulators are the drugs(herbs) which regulates the above five functions

1. **CORIANDER (धनिया)**

- **Coriander** is an annual herb in the family Apiaceae.
- Synonyms- **Chinese parsley**, **dhania**, or **cilantro**
- All parts of the plant are edible, but the fresh leaves and the dried seeds (as a spice) are the parts most traditionally used in cooking.
- It is used to flavour many foods, particularly sausages(meat product), curries, Scandinavian pastries, liqueurs(alcohol), and confectionery(मिठाइयाँ, केक, चॉकलेट आदि मिष्ठान), such as English comfits

➢ **Biological source-**

It is obtained from dried ripe fruit of *Coriandrum sativum* of family Umbelliferae

➢ **Chemical constituents**

- It contains
  - → Volatile oil
  - → Fixed oil
  - → Proteins
- Volatile oil contains
  - → D-linalool
  - → L-Borneol
  - → Geraniol
  - → Pinene
  - → Leaves contain Vit-A

➢ **Therapeutic efficacy**

2. FENNEL(सौंफ)

- **Fennel** is a flowering plant species in the carrot family.
- It is a perennial herb with yellow flowers and feathery leaves.
- It is grown for its edible shoots, leaves, and seeds.
- All parts of the plant are aromatic
- It is a highly flavourful herb used in cooking
- The seeds and extracted oil are used for aroma and taste and are used for scenting soaps and perfumes and for flavouring candies, liqueurs, medicines, and foods, particularly pastries, sweet pickles, and fish.

➢ **Biological source**

Dried ripe fruits of the plant *Foeniculum vulgare* of family Umbelliferae

➢ **Chemical constituents**

- It contains
  - → Volatile oils
  - → Fied oils
  - → Proteins
- Volatile oil mainly contains
  - → Anethole
  - → Fenchone
  - → Phellandrene
  - → Limonene
  - → Anisic aldehyde

➢ **Therapeutic activity**

* Acts as a mouth freshener
* Anti-ageing
* Prevents hair fall
* Antiseptic & anti-oxidant
* Prevents from eye disorders
* Helps reduce weight
* Relief from common cold & cough
* Promotes proper bowel movements
* Improves bone strength & development
* Relieves menstrual problems

3. CARDAMOM (इलाइची)

- **Cardamom** also called **cardamon** or **cardamum**, is a spice made from the seeds of several plants in the genera *Elettaria* and *Amomum* in the family Zingiberaceae.
- Both genera are native to the Indian subcontinent and Indonesia.
- Species used for cardamom are native throughout tropical and subtropical Asia.
- Cardamom has a strong, unique taste, with an intensely aromatic, fragrance.
- Green cardamom is one of the most expensive spices by weight but little is needed to impart flavour.

➢ **Biological source**

It is obtained from dried ripe fruit of *Elettaria cardamomum* of family Zingiberaceae

➢ **Chemical constituents**

- It contains
  - → Volatile oil
  - → Fixed oil
  - → Starch and proteins
- Volatile oil contains
  - → Cineole
  - → Borneole
  - → Terpineol
  - → Terpene alcohol

➢ **Therapeutic efficacy**

- Cures bad breath
- Improves appetite
- Enhances digestion
- Improves kidney health
- Detoxifies the body
- Helps to treat anaemia
- Improves sexual health
- Relieves in acidity
- Controls blood pressure
- Relieves in cold & flu

4. GINGER (अदरक)

- **Ginger** is a flowering plant whose rhizome, **ginger root** or ginger, is widely used as a spice and a folk medicine.
- It is a herbaceous perennial which grows annual pseudostems (false stems made of the rolled bases of leaves) about one meter tall bearing narrow leaf blades.
- The inflorescences bear flowers having pale yellow petals with purple edges
- Ginger is in the family Zingiberaceae, which also includes turmeric (*Curcuma longa*), cardamom (*Elettaria cardamomum*).
- Synonym- Zingiber, Zingiberis

➢ **Biological source**

Fresh or dried rhizomes of *Zingibar officinale* of family Zingiberaceae

➢ **Chemical constituents**

- It contains
  - → Volatile oils
  - → Starch
- Volatile oil contain
  - → Zingiberene
  - → Gingerol

➢ **Therapeutic efficacy**

1 - Powerful Medicinal Properties

2 - Reduce Muscle Pain and Soreness

3 - Treat Chronic Indigestion

4 - Lower Cholesterol Levels

5 - Reduce Menstrual Pain

6 - Prevent Cancer

7 - Help Fight Infections

8 - Anti-Inflammatory effects can help with Osteoarthritis

9 - Treat many forms of Nausea, Especially Morning Sickness

10 - Lower Blood Sugars and improve Heart Disease Risk Factors

5. CLOVE (लौंग)

- **Cloves** are the aromatic flower buds of a tree in the family Myrtaceae,
- They are native to the Maluku Islands (or Moluccas) in Indonesia, and are commonly used as a spice. Cloves are available throughout the year owing to different harvest seasons in different countries.
- **Synonym-** clove bud, clove flower, laung

➢ **Biological source**

It is obtained from dried flower buds of *Eugenia caryophyllus* of family Myrtaceae

➢ **Chemical constituents**

- Its volatile oil contain
  - → Eugenol
  - → Eugenol acetate
  - → Methylamineketone
  - → Caryophyllenes
  - → Esters and alcohols
- It also contain
  - → Tannin
  - → vanillin

➢ **Therapeutic efficacy**

6. **BLACK PEPPER (काली मिर्च)**

- **Black pepper** is a flowering vine
- It is cultivated for its fruit, known as a **peppercorn**, which is usually dried and used as a spice and seasoning(छौंक).
- The fruit is a drupe (stonefruit) dark red, and contains a stone which encloses a single pepper seed.
- Ground, dried, and cooked peppercorns have been used since antiquity, both for flavour and as a traditional medicine.
- Black pepper is the world's most traded spice, and is one of the most common spices added to cuisines around the world.
- Its spiciness is due to the chemical compound piperine

➢ **Biological source**

It consists of dried, unripe fruits of *Piper nigrum* of family Piparaceae.

➢ **Chemical constituents**

it consist of

- Alkaloids
  - → Piperine
  - → Piperidine
- Volatile oil
- Starch
- Volatile oil contain
  - → Phellandrene
  - → Caryophyllene

➢ **Therapeutic efficacy**

7. **ASAFOETIDA (हींग)**

- **Asafoetida** is the dried latex exuded from the rhizome or tap root of several species of *Ferula*
- **It** perennial herbs
- Asafoetida has a pungent smell, therefore also called "stinking gum". The odor dissipates upon cooking
- Asafoetida is also known colloquially as "devil's dung" in English

➢ **Biological source**

it is the oleo-gum-resin obtained by incising the living rhizomes and roots of *Ferula foetida* of family Umbelliferae

➢ **Chemical constituents**

It consist of

- Volatile oil
  - → Isobutyl propanyl disulphide
- Resins
  - → Notannol
  - → resinalcohol
- Gums
- Umbellic acid
- Umbelliferone

➢ **Therapeutic efficacy**

1. HELPS REDUCE MENSTRUAL CRAMPS
2. MAINTAINS BLOOD PRESSURE LEVELS
3. REDUCES DIGESTION-RELATED AILMENTS
4. RELIEF AGAINST INSECT BITES
5. REDUCES BREATHING-RELATED AILMENTS
6. GOOD FOR SKIN
7. PREVENTS BLEMISHES AND PIGMENTATION
8. RESTORES HAIR MOISTURE
9. PREVENTS ACNE

8. NUTMEG(जायफल)


- **Nutmeg** is the seed of the genus *Myristica*.
- It is a dark-leaved evergreen tree cultivated for two spices derived from its fruit: nutmeg, from its seed, and **mace**, from the seed covering.
- It is also a commercial source of an essential oil and nutmeg butter.

➢ **Biological source**

It is obtained from dried ripe seed of *Myristica fragrant* of family Myristicaceae

➢ **Chemical constituents**

It contains

- Volatile oil
- Fats
- Volatile oil contain
  - → Myristicin
  - → Elemicin
  - → Safrole
- Fatty acid contain
  - → Myristic acid
  - → Palmitic acid
  - → Oleic acid
  - → Lauric acid

➢ **Therapeutic efficacy**

1. ANTICONVULSANT PROPERTIES
2. EFFECTS AGAINST DIARRHOEA
3. REDUCES BAD CHOLESTEROL
4. GOOD FOR SKIN
5. REGULATES BLOOD PRESSURE
6. ANTIDEPRESSANT
7. PROTECTS LIVER
8. GOOD FOR ORAL HEALTH
9. IMPROVES BRAIN HEALTH
10. IMPROVES DIGESTION
11. PROVIDES RELIEF FROM INSOMNIA
12. PROVIDES RELIEF FROM PAIN

9. CINNAMON(दालचीनी)

- **Cinnamon** is a spice obtained from the inner bark of tree from the genus *Cinnamomum*.
- Cinnamon is used mainly as an aromatic condiment and flavouring additive in a wide variety of cuisines, sweet and savoury dishes, breakfast cereals, snackfoods, tea and traditional foods.
- The aroma and flavour of cinnamon derive from its essential oil and principal component, cinnamaldehyde, as well as numerous other constituents including

➢ **Biological source**

It is obtained from dried inner bark of the shoots of trees of *Cinnamomum zeylanicum* of family Lauraceae

➢ **Chemical constituents**

It contains

- Volatile oil
- Tannins
- Mucilage
- Calcium oxalate
- Starch
- Mannitol
- Cinnamon oil contain
  - → Eugenol
  - → Benzaldehyde
  - → Cuminaldehyde

➢ **Therapeutic efficacy**

ASTRINGENTS

- **Astringent**, any of a group of substances that cause the contraction or shrinkage of tissues and that dry up secretions. Astringents are usually classified into three groups according to their mode of action:
- Based on mode of action astringent can be classified into three categories
  i) The first kind of classification is based on the property of those that narrow the blood vessels and decrease or limit the blood supply. Examples of such astringents are epinephrine and cocaine.
  ii) The second category is glycerol and alcohol or the main ingredient being alcohol their mode of action is abstracting water from the tissue.
  iii) The third classification is based on the action of those that coagulate the superficial tissue layers into a crust in order to stop the bleeding and stop the blood loss from the body and tissues. Examples of such kinds of astringents are calamine and alum which are metallic astringents.
- Astringent Uses
  i) Medical or Internal Use - When induced internally the astringent leads to constriction of the exposed tissues and the mucous membranes. So, when one is suffering from diarrhoea, sore throat, peptic ulcers and even haemorrhages the astringent drugs can help in reducing blood discharge, and discharge of blood serum and even undesired mucous secretions.
  ii) Beauty and Skin Uses - The usage of astringent is very popular in the skincare industry wherein it is used to clean after the makeup removal step is done and the leftover residual chemicals and oils are also cleaned. The astringent help to cleanse the skin, tighten pores and elevate the quality of the skin.

1. MYROBALAN (हरड़)

- ***Terminalia chebula***, commonly known as **black-** or **chebulic myrobalan**,
- **It** is a species of genus *Terminalia*
- **It is** native to South Asia from India and Nepal east to southwest China (Yunnan), and south to Sri Lanka, Malaysia, and Vietnam
- The tannin and anthraquinone constituents make the drug both astringent and cathartic in action
- Synonym- chebulic myrobalan, harde, haritki

- **Biological source**

Myrobalans are the dried fruits of *Terminalia chebula* of family Combretaceae

- **Chemical constituents**

It contain

- tannin
  tannin on hydrolysis yield chebulic acid and d-galloyl glucose
- β-sitosterol,
- anthraquinones
- fixed oil
- fixed oil contain esters of palmitic, oleic and linoleic acids.

➢ **Therapeutic efficacy**

- The harar fruit is antiseptic, diuretic, astringent and cardiotonic in action.
- It is a safe and effective purgative (पेट साफ़ करने वाली) and laxative
- It is an important ingredient of 'triphala', an Ayurvedic formulation used in the treatment of constipation, colic pain and kidney dysfunctions, eye diseases, and sore throat.
- Unripe fruits are more purgative and the ripe ones are astringent.

2. BLACK CATECHU (काले कत्था)

- It is an extract of acacia trees used variously as a food additive, astringent, tannin, and dye.
- It is extracted from several species of *Acacia*, but especially *Senegalia catechu* (*Acacia catechu*), by boiling the wood in water and evaporating the resulting brew.
- It is also known as **cutch**, **black cutch**, **cachou**, **cashoo**, **terra Japonica**, or **Japan earth**, and also **katha** in Hindi, **kaath** in Marathi, **khoyer** in Assamese and Bengali, and **kachu** in Malay

➢ **Biological source**

It is the dried aqueous extract obtained from the heartwood of *Acacia catechu* of family Leguminoseae

➢ **Chemical constituents**

- Acacatechin or Acacia catchin
- Catechu tannic acid
- Catechu red
- Quercetin
- Gum

➢ **Therapeutic efficacy**

- Astringent
- Digestant
- Expectorant
- For diarrhoea

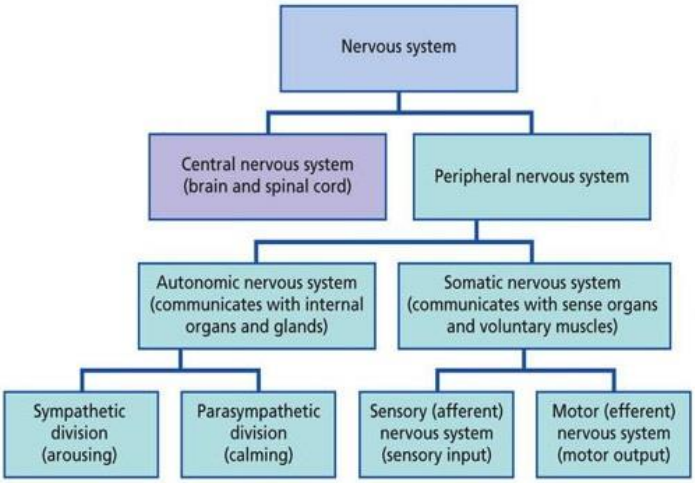
3. PALE CATECHU (पीला कत्था)

- **Gambier** or **gambir** is an extract derived from the leaves of *Uncaria gambir*
- It can be used as a tanning agent, a brown dye, a food additive and as herbal medicine.
- **Synonyms**-Gambier, pale catechu, catechu

- **Biological source-**
  It is a dried aqueous extract produced from the leaves and young twigs of *Uncaria gambier* of family Rubiaceae.
- **Chemical constituents**
  - Pale catechu contain
  - Pseudotannin catechin
  - Phlobatannin catechutannic acid.
  - Catechu red,
  - Gambier fluorescin
  - Quercetin.
  - Indole alkaloid which includes gambirtannin and its derivatives.
- **Therapeutic efficacy**
  - astringent.
  - In diarrhoea,
  - used in dyeing and tanning industries.
  - It is used for tanning of animal hides to convert it to leather.

DRUGS ACTING ON NERVOUS SYSTEM

The nervous system is **the major controlling, regulatory, and communicating system in the body**. It is the centre of all mental activity including thought, learning, and memory. Together with the endocrine system, the nervous system is responsible for regulating and maintaining homeostasis.



1. HYOSCYAMUS


- **It is** commonly known as **henbane**, **black henbane**, or **stinking nightshade**,
- it is a plant that is poisonous in large quantities,
- it belong to family Solanaceae.
- The dried leaves of henbane, yield three medicinal alkaloids—atropine, hyoscyamine, and scopolamine—that can be purified for use in pharmaceuticals
- It is used in traditional herbal medicine for **ailments of the bones, rheumatism, toothache, asthma, cough, nervous diseases, and stomach pain**.
- It might also be used as analgesic, sedative, and narcotic in some cultures.
- Synonym- hebane, Hyoscyamus herb, hyosyamus leaves

➢ **Biological source**

Obtained from dried leaves or flowering tops of Hyoscyamus niger of family Solanaceae.

➢ **Chemical constituents**

It contain three medicinal alkaloids—atropine, hyoscyamine, and scopolamine

➢ **Therapeutic efficacy**

It is used for

- Mydriatics
- Antispasmodic
- Anti-muscranic effect
- Cerebral sedative

2. **BELLADONA**


- **Belladonna** or **deadly nightshade**, is a toxic perennial herbaceous plant
- It belongs to family Solanaceae, which also includes tomatoes, potatoes, and eggplant (aubergine).
- It is native to Europe, North Africa, and Western Asia.
- The foliage and berries are extremely toxic when ingested, containing tropane alkaloids.
- These toxins include atropine, scopolamine, and hyoscyamine, which cause delirium and hallucinations, and are also used as pharmaceutical anticholinergics.
- Belladonna has unpredictable effects. The antidote for belladonna poisoning is physostigmine or pilocarpine, the same as for atropine.
- Synonym- belladonna leaf, belladonna herb, belladonna folium

➢ **Biological source**

Dried or fresh leaves, flowering and fruiting tops of *Atropa belladonna* of family Solanaceae

➢ **Chemical constituents**

It contains

- Alkaloid L-hyoscyamine
- Atropine
- Belladonine
- Scopoletin
- Hyoscine
- Pyridine
- N-methyl Pyrroline
- Volatile oil

➢ **Therapeutic efficacy**

It is used to treat

- Asthma
- Whooping cough
- Cold
- Hay fever
- Parkinsn’s disease
- Motion sickness
- Rheumatism

3. EPHEDRA


- Ephedra *(Ephedra sinica*) is an herb with a long history of use in traditional Chinese medicine for asthma, bronchitis, allergies, and cold and flu symptoms.
- Synonym- Ma huang, somkadi
- The primary active ingredients in ephedra are the alkaloids ephedrine and pseudoephedrine. Both increase heart rate, constrict blood vessels, dilate bronchial tubes, and have thermogenic properties to increase body heat and metabolic rate.

➢ **Biological source**

Dried young stem of *Ephedra sinica*(China), *Ephedra gerardiana*(India) of family Ephedraceae

➢ **Chemical constituents**

It contains amino alkaloids

- Ephedrine
- Nor-ephidrine
- N-methyl epehidrine
- Pseudo Ephidrine
- Nor pseudo ephidrine

➢ **Therapeutic efficacy**

It is used to treat

- **Hypotension under anesthesia**
- **allergic conditions**
- **bronchial asthma**
- **nasal congestion**
-

4. **OPIUM**

- **Opium** or **poppy tears** is dried latex obtained from the seed capsules of the opium poppy
- Approximately 12 percent of opium is made up of the analgesic alkaloid morphine, which is processed chemically to produce heroin and other synthetic opioids for medicinal use and for the illegal drug trade.
- The latex also contains the closely related opiates codeine and thebaine, and non-analgesic alkaloids such as papaverine and noscapine.
- Synonym- raw opium, gum opium and afeem

➢ **Biological source**

Opium is the dried milky exudate derived from the unripe seed capsules of the poppy plant, *Papaver somniferum* of family Papaveraceae

- **Chemical constituents**

  It contains 30 different alkaloids like
  - Morphine
  - Codeine
  - Noscopine
  - Papaverine
  - Thebaine
  - Narceine
- **Therapeutic efficacy**

  It is used for
  - Analgesic
  - Sedatives
  - Hypnotics
  - Anticough
  - Treatment of acute diarrhea

5. **TEA LEAVES**


- **Tea leaves** is a species of evergreen shrubs or small trees in the flowering plant family Theaceae.
- Its leaves and leaf buds are used to produce tea.
- Common names include "**tea plant**", "tea shrub", and "tea tree
- White tea, yellow tea, green tea, oolong, dark tea and black tea are all harvested from one of two major varieties grown today, *C. sinensis* var. *sinensis* and *C. s.* var. *assamica*, but are processed differently to attain varying levels of oxidation with black tea being the most oxidized and green being the least.
- Synonym- folia thea

- **Biological source**

  Obtained from the dried leaves of plant Camellia sinensis of family Theaceae
- **Chemical constituents**
  - Alkaloids
    - → Caffeine
    - → Theobromine
    - → Theophylline
  - Polyphenols
    - → Catechins
    - → Epicatechins
    - → Gallocatechins
  - Gallic acid
  - Carbohydrates, proteins , vitamins and essential oils

- **Therapeutic efficacy**

  It is used for
  - Anti-obesity
  - Cardioprotective
  - Neuroprotective
  - Osteoprotective
  - Antimicrobial
  - Anticancer

6. **COFEE SEEDS**

- A **coffee bean** is a seed of the *Coffea* plant and the source for coffee.
- It is the seed inside the red or purple fruit often referred to as a cherry.
- Just like ordinary cherries, the coffee fruit is also a so-called stone fruit.
- The fruits; cherries or berries, most commonly contain two stones with their flat sides together. A small percentage of cherries contain a single seed, instead of the usual two. This is called a "peaberry".
- The two most economically important varieties of coffee plant are the Arabica and the Robusta
- 60% of the coffee produced worldwide is Arabica and 40% is Robusta.
- Arabica beans consist of 0.8–1.4% caffeine and Robusta beans consist of 1.7–4.0% caffeine.
- Synonym- coffee seed , coffee bean

- **Biological source**

  It is obtained from **dried ripe seed** *Coffea Arabica* of family Rubiaceae

- **Chemical constituents**

  It contain
  - Oil
  - Wax
  - Caffeine
  - Aromatic oil
  - Tannic acid
  - Caffetannic acid
  - Gum
  - Sugar
  - Protein

- **Therapeutic efficacy** ⟶

7. **COCA**

- **Coca** is any of the four cultivated plants in the family Erythroxylaceae, native to western South America. Coca is known worldwide for its psychoactive alkaloid, cocaine.
- The cocaine alkaloid content of dry *Erythroxylum coca* var. *coca* leaves was measured ranging from 0.23% to 0.96%.
- Extraction of cocaine from coca requires several solvents and a chemical process known as an acid-base extraction, which can fairly easily extract the alkaloids from the plant.
- Synonym-coca, java coca, huanaco coca, truxllo coca

➢ **Biological source**

It is the dried leaves of *Erythroxylum coca* var. *coca* (Bolivian or Huánuco Coca),*Erythroxylum coca* var. *ipadu* (Amazonian Coca), *Erythroxylum novogranatense* var. *novogranatense* (Colombian Coca) and *Erythroxylum novogranatense* var. *truxillense* (Trujillo Coca) of family Erythroxylaceae

➢ **Chemical constituents**

It contain

- Alkaloids
  - → Cocaine
  - → Ecgonine
  - → Benzoyl ecgonine
  - → Senamole ecgonine

➢ **Therapeutic efficacy**

Coca extracts are used for

- stimulating stomach function,
- causing sedation,
- asthma,
- colds,
- altitude sickness

A. ANTI-HYPERTENSIVE

- **A type of drug used to treat high blood pressure**. There are many different types of antihypertensive agents, and they work in different ways to lower blood pressure. Some remove extra fluid and salt from the body. Others relax and widen the blood vessels or slow the heartbeat.
- **What is hypertension**
- **Causes of high BP**
- **Known causes of high blood pressure**
- **CHOLESTEROL**

ये topic Pharmaceutical chemistry में CH-7 में Anti-hypertensive Agents में करा दिए है| lecture का link में दिया है

1. RAUWOLFIA

- ***Rauvolfia*** (sometimes spelled *Rauwolfia*) is a genus of evergreen trees and shrubs, in the family Apocynaceae
- Commonly known as **devil peppers**,.
- The genus is named to honor Leonhard Rauwolf.
- The genus can mainly be found in tropical regions of Africa, Asia, Latin America, and various oceanic islands.
- Synonym- sarpagandha, chota chand, serpentina root, rauwolfia root

➢ **Biological source**

It is obtained from **dried rhizome and roots of Rauwolfia serpentine** of family Apocynaceae

➢ **Chemical constituents**

- Alkaloids
  - → Reserpine
  - → Ajamalicine
  - → Ajamaline
  - → Rauwolfinine
  - → Rescinnamine
  - → Reserpinine
  - → Yohimbine
  - → Serpentine

➢ **Therapeutic efficacy**

It is used as

- Antihypertensive
- Hypnotics
- Sedatives

B. ANTI-RHEUMATICS

- The term "antirheumatic drugs" refers to **agents used in the therapy of inflammatory arthritis, predominantly rheumatoid arthritis, but also idiopathic juvenile arthritis, psoriatic arthritis, ankylosing spondylitis and others**.
- Rheumatic diseases are **autoimmune and inflammatory diseases that cause your immune system to attack your joints, muscles, bones and organs**. Rheumatic diseases are often grouped under the term “arthritis” (except osteoarthritis)— which is used to describe over 100 diseases and conditions.

- Rheumatic diseases can cause damage to your vital organs, including the lungs, heart, nervous system, kidneys, skin and eyes. Rheumatic diseases may result in conditions so severe that those who suffer from them cannot bathe or dress themselves. Additionally, a simple task such as walking can cause pain and be difficult or even impossible.

1. COLCHICUM SEED

- ***Colchicum*** is a genus of perennial flowering plants containing around 160 species .
- It is a member of the family Colchicaceae
- It is native to West Asia, Europe, parts of the Mediterranean coast
- In this genus, the ovary of the flower is underground. As a consequence, the styles are extremely long in proportion, often more than 10 cm (4 in).
- All species in the genus are toxic.
- **Synonym-** Autumn Crocus, Cigdem , colquico, meadow saffron

➢ **Biological source**

It is obtained from dried ripe seeds of colchicum is *Colchicum autumnale* Linn. of family Liliaceae

➢ **Chemical constituents**

- Colchicine
- Colchifoline
- 2-demethylcolchicine
- Demecolcine
- 4-hydroxycolchicine
- N-deacetyl-N-formylcolchicine

➢ **Therapeutic efficacy**

It is used for

- Rheumatism
- Gout
- Tumour
- Anti-inflammatory activity

C. ANTI-DYSENTERIC

- The drugs and agents which have amoebicidal activity
- It is used to cure or prevent Amoebic dysentery
- Amoebic dysentery is caused by the protozoa Entamoeba histolytica
- Dysentery
  - → **Dysentery also** known as the **bloody flux**, is a type of gastroenteritis that results in bloody diarrhea.
  - → Other symptoms may include fever, abdominal pain, and a feeling of incomplete defecation. Complications may include dehydration.
  - → The cause of dysentery is usually the bacteria from
    - i) genus *Shigella*, in which case it is known as shigellosis, or
    - ii) The amoeba *Entamoeba histolytica*; then it is called amoebiasis.
    - iii) Other causes may include certain chemicals, other bacteria, other protozoa, or parasitic worms.

1. IPECACUANHA

➢ **Biological source**

The biological source of ipecac is the dried root or rhizome of Cephaelis ipecacuanha of family Rubiaceae

➢ **Chemical constituents**

- 2-3% of total alkaloids is present in the root of ipecac
- The other chemical constituents are
  - → emetine,
  - → cephaeline ,
  - → psychotrine
  - → psychotrine methyl ether

➢ **Therapeutic efficacy**

- It is work as an expectorant.
- It is also used as diaphoretic.
- It is used to treat amoebic dysentery.
- It have local irritant action.
- Ipecac has the property of emetic.
- inhibitors of human immunodeficiency virus.

D. OXYTOCIC

- Oxytocic are the drugs that have the power to stimulate the contraction of uterine muscle
- They are also called uterotonics
- Oxytocic agents are **medications that stimulate uterine activity and are used to induce labor, increase contractions, reduce the risk of postpartum hemorrhage immediately after birth, and expel fetal contents in incomplete abortion**.

1. **ERGOT**

- **Ergot** or **ergot fungi** refers to a group of fungi of the genus ***Claviceps***.
- The most prominent member of this group is *Claviceps purpurea* ("rye ergot fungus").
- This fungus grows on rye and related plants, and produces alkaloids that can cause ergotism in humans and other mammals who consume grains contaminated with its fruiting structure
- Synonym- ergot of rye, ergota

➢ **Biological source**

It is dried sclerotium of fungus *Claviceps purpurea* Tulasne of family Clavicipitaceae

➢ **Chemical constituents**

Alkaloid of ergot classifired in two groups: water soluble and water insoluble

	Group	Alkaloids
Water-soluble group		
I.	Ergometrine group	Ergometrine, Ergometrinine
Water-insoluble group		
II.	Ergotamine group	Ergotamine, Ergotaminine, Ergosine, Ergosinine
III.	Ergotoxine group	Ergocristine, Ergocristinine, Ergocryptine, Ergocryptinine, Ergocornine, Ertgocorninine

➢ **Therapeutic efficacy**

It is used as

- Oxytocic
- Vasoconstrictor
- Abortifacient
- to reduce post-partum haemorrhage
- analgesics for the treatment of migraine

ANTI-TUMOUR

- An abnormal mass of tissue that forms when cells grow and divide more than they should or do not die when they should.
- Tumours may be benign (not cancer) or malignant (cancer).
- Benign tumours may grow large but do not spread into, or invade, nearby tissues or other parts of the body.
- Malignant tumours can spread into, or invade, nearby tissues. They can also spread to other parts of the body through the blood and lymph systems. Also called neoplasm.
- General intro about tumour- covered in pharmaceutical chemistry ch-13

1. VINCA

- ***Vinca*** is a genus of flowering plants in the family Apocynaceae.
- It is native to Europe, northwest Africa and southwest Asia.
- Synonym-vinca rosea, Catharanthus, madagascar, periwinkle

➢ **Biological source**

It is dried entire plant of *Catharanthus roseu*s Linn. Of family Apocyanaceae

➢ **Chemical constituents**

It contains

- Alkaloids
- Indole and indoline alkaloids
- Ajmalicine
- Lochnerine
- Dimeric indole alkaloids
- Vimblastine and vincristine

➢ **Therapeutic efficacy**

- It used in the treatment of cancers like leukemia, Hodgkin,s disease, malignant lymphomas, neuroblastoma etc
- It is also used to treat diabetes, cough and sore throat.
- Also used as diuretics.

2. PODOPHYLLUM


- ***Podophyllum*** is an herbaceous perennial plant in the family Berberidaceae
- **Synonym- Mayapple**, **American mandrake**, **wild mandrake**, and **ground lemon**.
- All the parts of the plant are poisonous, including the green fruit, but once the fruit has turned yellow, it can be safely eaten . The ripe fruit does not produce toxicity.

➢ **Biological source**

It consist of the dried rhizome and root of *Podophyllum hexandrum* Royl. Of family Berberidaceae

➢ **Chemical constituents**

It contains

Resin

Podophyllotoxin

α-Peltatin

β-peltatin

➢ **Therapeutic efficacy**

- Rhizomes are used for typhoid fever, jaundice, dysentery, chronic hepatitis, scofula, rheumatism, skin diseases, tumerous growth, kidney & bladder problems.
- Plant is also used for gonorrhoea, and syphilis.
- The podophyllum is used as a purgative and also for treatment of vaginal warts.
- Two derivatives of podophyllotoxin, called eloposide and teniposide are employed for treatment of cancers.
- Root paste is applied on ulcers, cuts and wounds.

ANTIDIABETIC

- Anti-diabetic drugs- any drug that lower abnormally high glucose(sugar) level in the blood, which is a characteristic of disorder diabetes mellitus.
- For more detail see CH-9 of Pharmaceutical chemistry- HYPOGLYCEMIC AGENTS

1. PTEROCARPUS

- ***Pterocarpus marsupium***, also known as **Malabar kino**, **Indian kino**, **Vijayasar**, or **Venkai** is a medium to large, deciduous(झड़ने वाला) tree that can grow up to 31 m (102 ft) tall.
- It is native to India (where it occurs in parts of the Western Ghats in the Karnataka-Kerala region and in the forests of Central India), Nepal, and Sri Lanka.
- **Synonym-** Indian kino tree, bijasal, malabar kino

➢ **Biological source**

Consist of dried juice of the plant obtained by making vertical incisions on the stem of *Pterocarpus marsupium* of family Leguminosae

➢ **Chemical constituents**

- Kinotannic acid
- Kino-red
- Kinoin
- Pyrocatechin
- Resin
- Gallic acid

➢ **Therapeutic efficacy**

- Anti-diabetic
- Astringent
- Anti-diarrhoeal
- Toothache
- Haemorrhage
- In dyeing, tanning and printing

2. GYMNEMA

- It is a slow growing, perennial, medicinal woody climber.
- *Gymnema sylvestre* is regarded as one of the plants with potent anti diabetic properties.
- This plant is also used for controlling obesity in the form of *Gymnema* tea.
- The active compound of the plant is a group of acids termed as gymnemic acids.
- The plant is native to central and western India, tropical Africa and Australia.
- Synonym- Madhunashini, gudmar

➢ **Biological source**

It consist of leaves of plant Gymnema sylvestre of family Asclepiadaceae

➢ **Chemical constituents**

- Gymnemic acid
- Formic acid
- Butyric acid
- Mucilage
- d-quercitol
- Anthraquinone derivative

➢ **Therapeutic efficacy**

- Antidiabetic (stimulate insulin secretion)
- Stimulant
- Stomachic(भूख बढाने वाला)
- Laxative
- Diuretic

DIURETICS

- A **diuretic** is any substance that promotes diuresis(अधिक पेशाब होना).
- A diuretic tablet is sometimes colloquially(बोलचाल की भाषा में) called a **water tablet**.
- There are several categories of diuretics. All diuretics increase the excretion of water from the body, through the kidneys. There exist several classes of diuretic, and each works in a distinct way.
- Further deatil – Pharmaceutical chemistry, ch-8, Diuretics

1. GOKHRU

- **Gokhru** is an annual plant in the caltrop family (Zygophyllaceae)
- It is adapted to grow in dry climate locations in which few other plants can survive.
- Synonym- chota gokhru(hindi), Palleru(Telugu), Puncture vine, Goat's head.

➢ **Biological source**

Dried ripe fruits of *Tribulus terrestris* of family Zygophyllaceae

➢ **Chemical constituents**

- It consists of sapogenins such as
  - → diosgenin,
  - → chlorogenin,
  - → hecogenin
  - → neotigogenin.
- Other steroidal such as
  - → terestroside F,
  - → tribulosin,
  - → trillin,
  - → gracillin,
  - → dioscin

➢ **Therapeutic efficacy**

2. PUNARNAVA

- Punarnava is a species of flowering plant in the four o'clock family
- It is called **punarnava** which means rejuvenates or renews the body in Ayurveda
- Synonym- Hogweed, Tarvine(English), Raktakunda and Sothaghni(Sanskrit)

➢ **Biological source**

Fresh or dried herb of *Boerhaavia diffusa* of family Nyctaginaceae

➢ **Chemical constituents**

- Alkaloid
  - → Punarnavine
- Other
  - → Allointoin
  - → b-Sitosterol,
  - → palmitic acid,
  - → ester of b-sitosterol,
  - → arachidic acid,
  - → urosilic acid,
  - → b-Ecdysone,
  - → triacontanol

➢ **Therapeutic efficacy**

ANTISEPTIC AND DISINFECTANT

ANTISEPTIC

- An **antiseptic** is an antimicrobial substance or compound
- It is applied to living tissue/skin
- It reduce the possibility of infection, sepsis, or putrefaction.
- Antiseptics are different from antibiotics and disinfectant: as antibiotic has ability to safely destroy bacteria within the body, and *disinfectants* destroy microorganisms found on non-living objects.

DISINFECTANT

- A **disinfectant** is a chemical substance or compound used to inactivate or destroy microorganisms on inert surfaces.
- Disinfectants work by destroying the cell wall of microbes or interfering with their metabolism.

1. BENZOIN

- **Benzoin** or **benjamin** (corrupted pronunciation)[1] is a balsamic resin
- It obtained from the bark of several species of trees in the genus *Styrax*.
- It is used in perfumes and some kinds of incense and as a flavoring and medicine (tincture of benzoin).
- It is distinct from the chemical compound benzoin, which is ultimately derived chemically from benzoin resin; the resin, however, does not contain this compound.
- Benzoin is sometimes called **gum benzoin** or **gum benjamin**, and in India ***Sambrani*** *or* **loban**,
- Synonym- Sumatra benzoin, Gum benzoin

➢ **Biological source**

It is a balsamic resin obtained from *Styrax benzoin*(Sumatra benzoin), *Styrax tonkinesis*(siam benzoin) of family Styraceae

➢ **Chemical constituents**

It contains

- Balsamic acid- benzoic acid and cinnamic acid
- Esters of balsamic acid
- Triterpenoid acid- sumaresinolic siaresinolic acid
- Esters of coniferyl benzoate

➢ **Therapeutic efficacy**

2. MYRRH

- **Myrrh** is a gum-resin extracted from a number of small, thorny tree species of the genus *Commiphora*.
- Myrrh is used for problems in the stomach and intestines, congestion, parasite infections, and many other conditions
- Myrrh resin has been used throughout history as a perfume, incense and medicine.
- Myrrh mixed with posca or wine was common across ancient cultures, for general pleasure, and as an analgesic
- Synonym- Gum Myrrh, Bol, Myrrha

➢ **Biological source**

It is an oleo-gum-resin obtained from Commiphora molmol of family Burseraceae

➢ **Chemical constituents**

It contains

- Volatile oil
- Gum
- Resin and bitter principle
- Resin contains

  α-β and γ commiphoric acid
- volatile oil contains

  terpenes, cuminic aldehyde and eugenol
- gum contain oxydase enzyme

➢ **Therapeutic efficacy**

3. NEEM

- Neem is **a natural herb that comes from the neem tree**
- Neem is known for its pesticidal and insecticidal properties, but people also use it in hair and dental products

➢ **Biological source**

It consist of leaves and other aerial parts of *Azadirachta indica* of family Meliaceae

➢ **Chemical constituents**

- The active ingredients are Azadirachtin, Salannin and Meliantriol
- Neem leaves contain Nimbosterol and Quercetin
- Seeds contain Azadirachtin, Salanin, Meliantrol and Meliacin.
- The trunk bark contains Nimbin, Nimbinin, Nimbidin, Nimbosterol and a bitter principle called *Margosine.*
- Neem oil contains chiefly glycerides of Oleic (50%) and Stearic (20%) acids.

➢ **Therapeutic efficacy**

Leaf	Leprosy, eye problem, epistaxis, intestinal worms, anorexia, biliousness, skin ulcers
Bark	Analgesic, alternative and curative of fever
Flower	Bile suppression elimination of intestinal worms and phlegm
Fruit	Relieves piles, intestinal worms, urinary disorders, epistaxis ,phlegm, eye problem, diabetes , wounds and leprosy
Twig	Relieves cough, asthma ,piles, phantom tumor, intestinal worms, spermatorrhea, obstinate urinary disorders, diabetes
Gum	Effective against skin diseases like ring worms, scrabies, wounds and ulcers
Seed pulp	Leprosy and intestinal worms
Oil	Leprosy and intestinal worms
Root, bark, leaf, flower and fruit together	Blood morbidity, ulcers, burning, biliary afflictions, leprosy, skin sensation and itching

4. TURMERIC


- **Turmeric** is a flowering plant, of the ginger family, Zingiberaceae,
- the rhizomes of turmeric are used in cooking.
- The plant is a perennial, rhizomatous, herbaceous plant
- The rhizomes are used fresh or boiled in water and dried, after which they are ground into a deep orange-yellow powder commonly used as a coloring and flavoring agent in many Asian cuisines, especially for curries, as well as for dyeing
- Synonym- Indian saffron, Haldi

➢ **Biological source**

It consist of dried, as well as fresh rhizomes of plant known as Curcuma longa of family Zingiberaceae

➢ **Chemical constituents**

It contains

- Volatile oil contains
  Sesquiterpene, alcohol, ketone and monoterpene.
- Resin
- Zingiberaceous starch grains
- Yellow coluring substance curciminoids
- Chief component of curcuminoids is known as curcumin

- **Therapeutic efficacy**

ANTIMALARIALS

- **Antimalarial medications** or simply **antimalarials** are a type of antiparasitic chemical agent.
- They are often naturally derived,
- they used to treat or to prevent malaria
- Antimalarial drugs may be used to treat malaria in three categories of individuals-
  i) those with suspected or confirmed infection
  ii) those visiting a malaria-endemic regions who have no immunity, to prevent infection via malaria prophylaxis(preventive treatment of malaria), and
  iii) in broader groups of individuals, in routine but intermittent preventative treatment in regions where malaria is endemic via intermittent preventive therapy.

❖ For detail – see CH-11, L-5 of Pharmaceutical chemistry

1. CINCHONA

- **Cinchona** is a genus of flowering plants in the family Rubiaceae.
- The bark of several species yields quinine and other alkaloids that were the only effective treatments against malaria in older days
- Synonym- Jesuit's bark, Peruvian bark, Calisaya bark

➢ **Biological source**

It is obtained from dried bark of *Cinchona calisaya*, *Cinchona succirubra*, *Cinchona ledgeriana* of family Rubiaceae

➢ **Chemical constituents**

It contain 25 alkaloids of which important are

- Quinine
- Quinidine
- Cinchonine
- Cinchonidine
- Cupreine
- Hdroquinine
- Quinic acid

➢ **Therapeutic efficacy**

- Antimalarials
- Stomachic
- Arterial fibrillation
- Cardiac depressant
- Prevent arrhythmias
- Antipyretics

2. **ARTEMISIA**


- **Artemisia** has diverse genus of plants with between 200 and 400 species belonging to the daisy family Asteraceae.
- Common names for various species in the genus include mugwort, wormwood, and sagebrush.
- *Artemisia* comprises hardy herbaceous plants and shrubs
- Most species have strong aromas and bitter tastes from terpenoids and sesquiterpene lactones, which discourage herbivory
- Synonym- Santonica, wormseed

➢ **Biological source**

It is an unexpanded flower head of plant *Artemisia cina* Berg., *Artemisia brevifolia* Wall, *Artemisia maritima* Linn of family Asteraceae

➢ **Chemical constituents**

- Santonin
- Artemisin

➢ **Therapeutic efficacy**

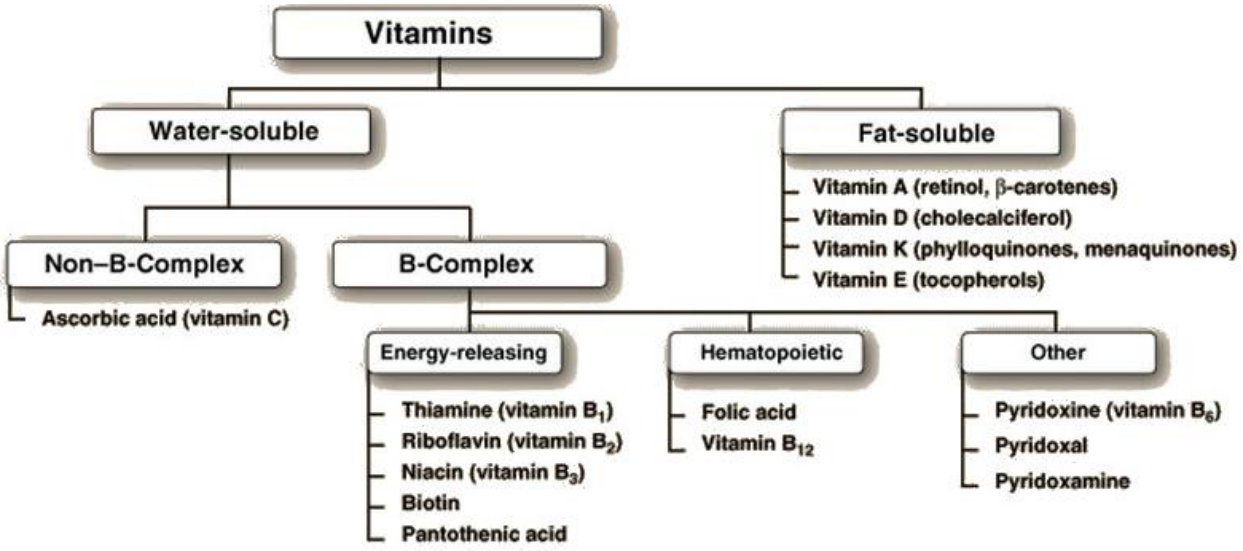
- fevers,
- inflammation,
- headaches,
- bleeding,
- malaria.

VITAMINS

- A **vitamin** is an organic molecule
- It is an essential micronutrient which an organism needs in small quantities for the proper functioning of its metabolism.
- Essential nutrients cannot be synthesized in the organism, either at all or not in sufficient quantities, and therefore must be obtained through the diet.
- The term *vitamin* does not include the three other groups of essential nutrients like minerals, essential fatty acids, and essential amino acids.
- Most vitamins are not single molecules, but groups of related molecules called vitamers. For example, there are eight vitamers of vitamin E: four tocopherols and four tocotrienols.
- Some sources list fourteen vitamins, by including choline, but major health organizations list thirteen: as follows

VITAMIN	OTHER NAMES	EXAMPLES OF PHYSIOLOGICAL FUNCTIONS
Vitamin A	Retinol, retinoic acid, retinal, carotenoid	Growth, maintenance of skin, bone development, maintenance of myelin, maintenance of vision
Vitamin B_1	Thiamine	Growth, appetite, digestion, nerve activity, energy production
Vitamin B_2	Riboflavin	Growth and development of foetus, redox systems, and respiratory enzymes; maintenance of mucosal, epithelial, and eye tissues
Vitamin B_3	Nicotinamide, niacinamide, nicotinic acid, niacin	Maintenance of NAD and NADP, coenzyme in lipid catabolism, oxidative deamination
Vitamin B_5	Pantothenic acid	Lipid metabolism, protein metabolism, part of coenzyme A in carbohydrate metabolism
Vitamin B_6	Pyridoxine, pyridoxol, adermine	Growth; protein, CHO, and lipid metabolism; coenzyme in amino acid metabolism
Vitamin B_7	Biotin, protective factor X	Growth; maintenance of skin, hair, bone marrow, and sex glands; biosynthesis of aspartate and unsaturated fatty acids
Vitamin B_9	Folic acid, folacin, folinic acid	Synthesis of nucleic acid, differentiation of embryonic nervous system
Vitamin B_{12}	Cobalamin	Coenzyme in nucleic acid, protein, and lipid synthesis; maintenance of epithelial cells and nervous system
Vitamin C	Ascorbic acid	Absorption of iron, antioxidant, growth, wound healing, formation of cartilage, dentine, bone and teeth, maintenance of capillaries
Vitamin D	Vitamin D_3, cholecalciferol, calcitriol	Normal growth, Ca and P absorption, maintains and activates alkaline phosphatase in bone, maintains serum calcium and phosphorus levels
Vitamin E	Tocopherol, Tokopharm, tocotrienols	Antioxidant, growth maintenance, aids absorption of unsaturated fatty acids, maintains muscular metabolism and integrity of vascular system and central nervous system
Vitamin K	Prothrombin factor, menaquinones	Blood-clotting mechanisms, electron transport mechanisms, growth, prothrombin synthesis in liver

❖ **Types of vitamins-**



❖ Source of vitamins

Vitamin	Where to Find It
A	Beef liver and other organ meats; salmon; green, leafy vegetables; orange and yellow vegetables; fruits, including cantaloupe, apricots, and mangos; dairy products
B1 (thiamine)	Whole grains; meat (especially pork); fish; legumes; seeds; nuts
B2 (riboflavin)	Cheese; almonds; beef and lamb; mackerel; eggs; pork; mushrooms; sesame seeds; spinach
B3 (niacin)	Dairy; eggs; enriched breads and cereals; fish; lean meat; legumes; nuts
B5	Avocado; broccoli; kale; cabbage; eggs, legumes; milk; mushrooms; organ meat; poultry; potatoes; yeast
B6	Beans; poultry; fish; some vegetables and fruits, especially dark leafy greens, papayas, oranges, and cantaloupes
B12	Clams; liver; fortified breakfast cereal; trout; salmon; tuna; haddock; beef; milk
Biotin	Red meat; salmon; halibut; liver; egg yolks; cauliflower; lettuce; cucumbers; spinach
Folate	Beans; lentils; spinach; asparagus; lettuce; avocado; broccoli; mango; oranges
C	Citrus fruits; peppers; guava; kale; broccoli; tomatoes; peas
D	Cod liver oil; swordfish; salmon; tuna; orange juice; milk; yogurt; sardines; liver; eggs
E	Nuts (peanuts, hazelnuts, and especially almonds); seeds (like sunflower seeds); green vegetables

❖ Deficiency disease of vitamins

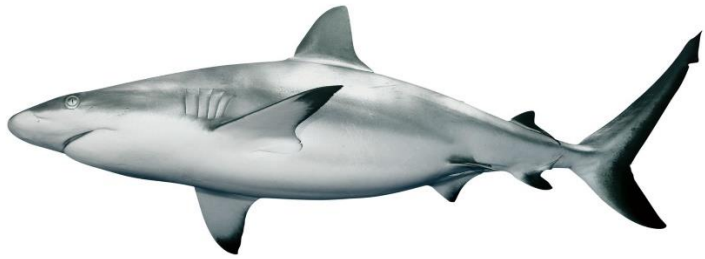
Vitamin	Chemical Name	Deficiency Diseases
Fat soluble Vitamins		
A	Retinol, Retinal, Retinoic acid	Night-blindness and keratomalacia
D	Ergocalciferol (D_2), Cholecalciferol (D_3)	Rickets and Osteomalacia
E	Tocopherol	Mild hemolytic anemia in newborn infants
K	Phylloquinone (K_1), Menaquinones (K_2)	Bleeding diathesis
Water soluble vitamins		
B_1	Thiamine	Beriberi
B_2	Riboflavin	Ariboflavinosis
B_3	Niacin, Niacinamide	Pellagra
B_5	Pantothenic acid	Paresthesia
B_6	Pyridoxine, Pyridoxamine, Pyridoxal	Anemia peripheral neuropathy
B_7	Biotin	Dermatitis
B_9	Folic acid, Folinic acid	Neural tube defects
B_{12}	Cyanacobalamine	Megaloblastic anemia
C	Ascorbic acid	Scurvy

1. COD LIVER OIL

Synonym- Oleum morrhi

- **Biological source**
  It is prepared from fresh liver of cod fish Gadus morrhua of family Gladidae
- **Chemical constituents**
  It mainly consists of
  - omega-3 fatty acids,
  - eicosapentaenoic acid (EPA)
  - docosahexaenoic acid (DHA).
  - vitamin A and D,
- **Therapeutic efficacy**
  - Lower inflammation all over the body.
  - reduce pain associated with arthritis.
  - reduce anxiety and depression.
  - promote healthy fetal brain function and eyesight.
  - maintain bone density.
  - lower risks of type 1 diabetes when used in pregnancy and in newborns.
  - support a healthy immune system.

2. SHARK LIVER OIL



Synonym- Oleum selachoids

- **Biological source**
  It is obtained from the fresh and preserved livers of various species of shark mainly from *Hypoprion brevirostris* of family Carcharhinidae
  In india *Scoliodon, Carcharias and Sphyrna* are common
- **Chemical constituents**
  It contains
  - Vitamin A
  - Glycerides of saturated and unsaturated fatty acid
- **Therapeutic efficacy**
  - In the deficiency of vitamin A
  - Used as Anti-xerophthalmic factor
  - Used in sunburn ointment

ENZYMES

- **Enzymes** are proteins that act as biological catalysts (biocatalysts).
- Catalysts accelerate chemical reactions.
- The molecules upon which enzymes may act are called substrates, and the enzyme converts the substrates into different molecules known as products.
- All metabolic processes in the cell need enzyme catalysis in order to occur at rates fast enough to sustain life.
- The study of enzymes is called *enzymology*
- Enzymes are known to catalyze more than 5,000 biochemical reaction types.
- Other biocatalysts are catalytic RNA molecules, called ribozymes.
- Enzymes' specificity comes from their unique three-dimensional structures.
- Like all catalysts, enzymes increase the reaction rate by lowering its activation energy
- Chemically, enzymes are like any catalyst and are not consumed in chemical reactions, nor do they alter the equilibrium of a reaction.
- Enzyme activity can be affected by other molecules: inhibitors are molecules that decrease enzyme activity, and activators are molecules that increase activity.
- Many therapeutic drugs and poisons are enzyme inhibitors.
- An enzyme's activity decreases markedly outside its optimal temperature and pH, and many enzymes are (permanently) denatured when exposed to excessive heat, losing their structure and catalytic properties.

1. PAPAYA


- Papaya also called papain
- Papain is a proteolytic enzyme extracted from the raw fruit of the papaya plant. Proteolytic enzymes help break proteins into smaller protein fragments called peptides and amino acids.

➢ **Biological source**

It is obtained from the latex of unripe fruit and leaves of *Carica papaya* Linn. of family Caricaceae

➢ **Chemical constituents**

- Papain
- Chymopapain
- Polypeptides
- amides

➢ **Therapeutic efficacy**

It is used for

- Pain and swelling (inflammation)
- Fluid retention
- Digestive aid
- Treating parasitic worms,
- Inflammation of the throat and pharynx,
- diarrhoea
- hay fever
- runny nose
- skin condition called psoriasis.

2. **DIASTASE**

- Diastase originates from the Greek word diastasis, which implies “separation.”
- Diastase is an enzyme found in malt produced during the germination of the seeds.
- It is effective in converting starch into maltose and eventually transforms into sugar.
- Synonym- amylase, salivary diastase, malt diastase

➢ **Biological source**

It is obtained from the dried germinated barley grains (malt) of *Hordeum vulgare* of family Poaceae

➢ **Chemical constituent**

Malt contain

- Dextrin
- Maltose
- Glucose
- diastase

➢ **Therapeutic efficacy**

It is used as

- Digestant
- In the production of pre-digested starchy food
- Conversion of starch to fermentable sugars in fermentation and brewing industries

3. **PANCREATIN**

- Pancreatin is a combination of digestive enzymes .
- These enzymes are normally produced by the pancreas and are important for digesting fats, proteins, and sugars.
- Pancreatin is used to replace digestive enzymes when the body does not have enough of its own. Certain medical conditions can cause this lack of enzymes, such as cystic fibrosis, pancreatitis, pancreatic cancer, or pancreas surgery.
- Pancreatin may also be used to treat a condition called steatorrhea (loose, fatty stools).
- Synonym- diastase vera, Pandrotanon, Zypanar

➢ **Biological source**

It is produced by the exocrine cells of the pancreas of *Sus scrofa* (Pig or Hog) of family Suidae. Or from pancreas of Bos taurus(Ox or calf) of family Bovidae

➢ **Chemical constituent**

It contain

- Amylase
- Lipase
- Protease

➢ **Therapeutic efficacy**

It is used when the pancreas cannot make or does not release enough digestive enzymes into the gut to digest the food.

4. YEAST

- **Yeasts** are eukaryotic, single-celled microorganisms and members of the fungus kingdom.
- The yeast species *Saccharomyces cerevisiae* converts carbohydrates to carbon dioxide and alcohols through the process of fermentation. The products of this reaction have been used in baking and the production of alcoholic beverages for thousands of years.
- Other species of yeasts, such as *Candida albicans*, are opportunistic pathogens and can cause infections in humans.
- Yeasts have recently been used to generate electricity in microbial fuel cells and to produce ethanol for the biofuel industry.
- Synonym- Brewer's yeast and Bakers yeast

➢ **Biological source**

It is a unicellular fungal microorganism *Saccharomyces cerevisae* of family Saccharomycetaceae

➢ **Chemical constituents**

- Thiamine
- Riboflavine
- Nicotinic acid
- Folic acid
- Pantothenic acid
- biotin

➢ **Therapeutic efficacy**

It **may help to treat**

- eczema,
- gout,
- infectious diarrhea,
- some heart problems.
- lower cholesterol
- boost the immune system.
- also improve physical and mental health.
- help control diabetes.

PHARMACEUTICAL AIDS

- Pharmaceutical aids are the **drugs which have no or little pharmacological effects** but they are essentially used in the preparation of pharmaceutical dosage form like tablets, Injections, emulsions, ointments.
- A large number of inorganic as well as organic chemicals are known which find extensive as well as valid application in the processing of pharmaceuticals. These are having very little or no therapeutically value but are necessary in the manufacture of various dosage forms such as ointments, orals, tablets, liquids, injectables etc. Such substances are known as pharmaceutical aids.
- These may be required for such purposes as preservations, stabilization, acidification, alkalization, suspending, excipient, adsorption, absorption, filtration, prevention of oxidation, stabilization, complexation etc.
- Pharmaceutical aids may remain in the final product in which case they do not exert any specific action on the body when the product is administrated or they may get removed during processing but come in close contact with the product at some stage.
- Many times pharmaceutical aids are referred to as “pharmaceutical necessities”.

❖ **CLASSIFICATION:**

Colouring agents	: Caramel, Turmeric, Saffron
Flavouring agents	: Cardamom, lemon oil, Mentha oil
Sweetening agents	: Licorice, Honey
Emulsifying and Suspending agents	: Acacia, Agar, Bentonite, Gelatin
Ointment bases	: Bees wax, Lanolin, wool fat
Diluents	: Sesame oil, glucose, lactose
Vehicles	: Olive oil, Arachis oil
Disintegrating agents	: Starch, Ispagol husk
Lubricants	:Talc, Cocoa butter

1. KAOLIN

- **kaolin**, also called **china clay**, soft white clay that is an essential ingredient in the manufacture of china and porcelain and is widely used in the making of paper, rubber, paint, and many other pharmaceutical products. Kaolin is named after the hill in China (Kao-ling) from which it was mined for centuries.
- In its natural state kaolin is a white, soft powder consisting principally of the mineral kaolinite
- Synonym- china clay, paper clay, white clay

➢ **Biological source**

Kaolin is purified native hydrated Aluminium silicate free from gritty particles

➢ **Chemical constituents**

It is anhydrous aluminium silicate ($Al_2O_3(SiO_2)_2(H_2O)_2$), it contains

Component	Content (wt.%)	Element	Content (wt.%)
SiO_2	64.57	Si	30.06
Al_2O_3	20.26	Al	10.72
Fe_2O_3	1.07	Fe	0.37
CaO	0.63	Ca	0.45
MgO	0.46	Mg	0.28
Na_2O	0.40	Na	0.30
K_2O	4.46	K	3.70
TiO_2	1.60	Ti	0.96
Loss on ignition (LOI)	6.35		

➢ **Therapeutic efficacy**

It is used in

- Mild to moderate diarrhoea
- Tablet preparation
- To filter materials
- Facial cleanser
- Detox and clear pores
- Absorb excess oil
- Skin soother
- Fight acne
- Tooth cleanser
- Cleanses hair
- Work as a deodorant
- Tone your skin

2. LANOLIN

- **Lanolin** , also called **wool yolk**, **wool wax**, or **wool grease**, is a wax secreted by the sebaceous glands of wool-bearing animals.
- Lanolin used by humans comes from domestic sheep breeds that are raised specifically for their wool.
- Historically, many pharmacopoeias have referred to lanolin as wool fat. however, as lanolin lacks glycerides (glycerol esters), it is not a true fat.
- Lanolin primarily consists of sterol esters.
- Lanolin's waterproofing property aids sheep in shedding water from their coats. Certain breeds of sheep produce large amounts of lanolin.
- Lanolin's role in nature is to protect wool and skin from climate and the environment; it also plays a role in skin (integumental) hygiene.
- Lanolin and its derivatives are used in the protection, treatment and beautification of human skin.
- Synonym- wool wax, wool grease, Wool fat

➢ **Biological source**

Lanolin is the fat-like secretion of the sebaceous glands which is deposited into the wool fibres of sheep, *Ovis aries* Linn., belonging to family Bovidae.

➢ **Chemical constituents**

It contains

- Esters of cholesterol and isocholesterol
- Carnaubic acid
- Palmitic acid
- Myristic acid
- Oleic acid
- Lanoceric acid
- Lanopalmitic acid

➢ **Therapeutic efficacy**

It is used as

- Water absorbable ointment bases
- An ingreidient of water soluble creams and cosmetics preparation
- Emollient- Emollients are substances that soften and moisturize the skin and decrease itching and flaking
- as a moisturizer to treat or prevent dry, rough, scaly, itchy skin and minor skin irritations (e.g., diaper rash, skin burns from radiation therapy).

3. BEESWAX

- **Beeswax** (***cera alba***) is a natural wax produced by honey bees of the genus *Apis*.
- The wax is formed by worker bees, which secrete it from eight wax-producing glands
- The new wax is initially glass-clear and colorless, becoming opaque after chewing and being contaminated with pollen by the hive worker bees, becoming progressively yellower or browner by incorporation of pollen oils and propolis.
- Synonym- cera alba, white bees wax, yellow bees wax

➢ **Biological source**

It is obtained from the honey comb of the bees *Apis melifera* of family Apidae

➢ **Chemical constituents**

It consist of

- Esters of monohydric alcohols
- Myricin
- Free cerotic acid
- Melissic acid
- Cerolein

➢ **Therapeutic efficacy**

- In preparation of ointments, plasters and polishes.
- Also used in the manufacturing of candles, moulds in dental and electronic industries, cosmetics for lip-sticks, face cream.
- Is an ingredient of paraffin ointment.

4. ACACIA

- **It is also called Gum arabic**, *gum sudani*, **acacia gum**, **Arabic gum**, **gum acacia**, **acacia**, **Senegal gum**, *Indian gum*,
- It is a natural gum originally consisting of the hardened sap

➢ Gum arabic is a complex mixture of glycoproteins and polysaccharides predominantly consisting of arabinose and galactose.

➢

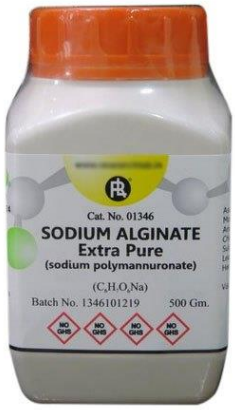
- **Biological source**
  It is dried gummy exudation obtained from the stem and branches of *Acacia arabica* wild or *Acacia senegal* of family Leguminosae
- **Chemical constituents**
  - Arabin – it is a mixture of calcium, magnesium and potassium salts of Arabic acid
  - Arabic acid hydrolyses into L-rhamnose, D-galactose, D-glucoronic acid
  - Enzyme oxidase
- **Therapeutic efficacy**
  - As demulcent
  - Pharmaceutical aid for emulsification
  - Thickening agent
  - Binding agent in tablets
  - It is a colloidal stabliser

5. TRAGACANTH

- **Tragacanth** is a natural gum obtained from the dried sap of several species of legumes of the genus *Astragalus*,
- Gum tragacanth is a viscous, odorless, tasteless, water-soluble mixture of polysaccharides obtained from sap
- The gum seeps from the plant in twisted ribbons or flakes that can be powdered. It absorbs water to become a gel, which can be stirred into a paste. The major fractions are known as tragacanthin, highly water-soluble as a mucilaginous colloid
- The gum has been used historically as a herbal remedy for conditions as cough and diarrhea.
- As a mucilage or paste, it has been used as a topical treatment for burns.
- It is used in pharmaceuticals and foods as an emulsifier, thickener, stabilizer
- Synonym- Goat's thorn, gum tragacanth, gum dragon

- **Biological source**
  It is dried gummy exudation obtained from incisons on stems and branches of Astragalus gummifier of family Leguminosae
- **Chemical constituents**
  - Tragacanthin- water soluble
  - Bassorin- water insoluble
  - Tragacanthic acid
  - Galacturonic acid
  - D-galactopyranose
  - D-xylopyranose
  - L-arabino-rhamnose
- **Therapeutic efficacy**
  - As demulcent in cough and cold preparation
  - To treat diarrhoea
  - As emollient in cosmetics
  - Thickening, suspending and as emulsifying agent
  - As binders in tablets

6. SODIUM ALGINATE



- Sodium alginate ($NaC_6H_7O_6$) is a linear polysaccharide derivative of alginic acid
- Sodium alginate is a cell wall component of marine brown algae, and contains approximately 30 to 60% alginic acid.
- Bacterial alginates are synthesized by only two bacterial genera, *Pseudomonas* and *Azotobacter*, and is used for protection from the environment and the synthesis of biofilms in order to adhere to surfaces.
- The biggest advantage of alginates is its liquid–gel behavior in aqueous solutions.
- Synonym- Algin, Sodium polymannuronate

➢ **Biological source**

It is the sodium salt of brown algal species of

- Macrocystic pyrifera
- Laminaria hyperborean
- Laminaria digitata
- Ascophyllum nodosum

All belongs to Pheophyceae

➢ **Chemical constituents**

- It is sodium salt of alginic acid
- Alginic acid is composed of D-mannuronic acid and L-guluronic acid

➢ **Therapeutic efficacy**

It is used in

- Dermatological preparation
- Dental preparation
- Textile industry
- As emulsifier
- In cosmetics

7. AGAR

- **Agar** or **agar-agar**, is a jelly-like substance consisting of polysaccharides obtained from the cell walls of some species of red algae, primarily from ogonori (*Gracilaria*) and "tengusa" (*Gelidiaceae*).
- Agar is a mixture of two components, agarose and agaropectin
- It forms the supporting structure in the cell walls of certain species of algae and is released on boiling.
- These algae are known as agarophytes, belonging to the Rhodophyta (red algae) phylum.
- Synonym- agar-agar, vegetable gelatin

➢ **Biological source**

It is a dried gelatinous substance obtained from Gelidium amansii and other species of red algae like Gracilaria and Pterocladia, they all belong to family Gelidiaceae

➢ **Chemical constituents**

It contains

- Agarose
- Agaropectin
- Agarose contain D-galactose and L-galactose

➢ **Therapeutic efficacy**

it is used as

- emulsifying agents
- bulk laxatives
- preparation of jellies and biological culture medium
- preparation of ointment and medical encapsulation

8. GUAR GUM

- **Guar gum**, also called **guaran**, is a galactomannan polysaccharide extracted from guar beans that has thickening and stabilizing properties useful in food, feed, and industrial applications.
- The guar seeds are mechanically dehusked, hydrated, milled and screened according to application.
- It is typically produced as a free-flowing, off-white powder.
- Synonym- Guar flour, jaguar gum, guaran

➢ **Biological source**

It is the powder endosperm of seed of *Cyamopsis tetragonolobus* of family Leguminoseae

➢ **Chemical constituents**

- Guaran (galactomannan)
- Guaran on hydrolysis yield galactose and mannose
- It also contain protien

➢ **Therapeutic efficacy**

- Thickening agent
- Bulk laxative
- Appetite depressant
- Used in suspension, emulsion, lotion etc
- As binding and disintegrating agent in tablets

9. GELATINE

- **Gelatin** or **gelatine** is a translucent, colorless, flavorless food ingredient, commonly derived from collagen taken from animal body parts.
- It is brittle when dry and rubbery when moist.
- It is commonly used as a gelling agent in food, beverages, medications, drug and vitamin capsules, photographic films and papers, and cosmetics.
- Substances containing gelatin or functioning in a similar way are called **gelatinous substances**.
- Synonyms- Gel foam, puragel, gelatinum

➢ **Biological source**

Gelatin is a protein extracted by partial hydrolysis of animal collegenous tissue like skins, tendons, ligaments and bones with boiling water.

➢ **Chemical constituents**

➢ It contains

- Amino acids mainly lysine
- It is composed by glutin protein

➢ **Therapeutic efficacy**

- In manufacturing of hard and flexible shells
- For preparing pessaries, paste, pastles and suppositories
- Used as haemostasis
- Used as suspending agent, tablet binders, coating agents etc

MISCELLANEOUS

1.SQUILL


- **Synonyms**-Jangali pyaj, Sea onion, urginea
- **Biological source**

  It is obtained from sliced and dried scale leaves from Urginea maritime's bulb of family Liliaceae
- **Chemical constituents**

  It contain contains
  - cardiac glycosides scillaren A and B
  - enzyme scillatenase.
  - glucoscillaren A (cardiac glycoside),
  - proscillaridin A,
  - flavonoid,
  - mucilage,
  - sinistrin.
  - The cardiac glycoside (glucoscillaren A) on hydrolysis gives three glucose molecules, 2 molecules of glucose and a molecule of rhamnose along with scillarenin.
  - Scillaren-A on hydrolysis yields proscillaridin A and glucose.
  - Proscillaridin A on further acid hydrolysis yields the aglycone scillarenin A and rhamnose.
- **Therapeutic efficacy**

  It is used for
  - stimulating,
  - expectorant
  - diuretic,
  - it is also a cardiac tonic, acting in a similar manner to digitalis,
  - useful in chronic bronchitis, and asthma

2.GALLS


- **Galls** or ***cecidia*** are a kind of swelling growth on the external tissues of plants, fungi, or animals.
- Plant galls are abnormal outgrowths of plant tissues, similar to benign tumors or warts in animals. They can be caused by various parasites, from viruses, fungi and bacteria,
- Plant galls are often highly organized structures so that the cause of the gall be determined.
- Synonym- Nutgalls, Turkey gall, blue gall

- **Biological source-**

  Galls are vegetative outgrowth caused by the gall wasp *Adleria gallaetinctorae* depositing egg on the twigs of *Quercus infectoria* of family Fagaceae

- **Chemical constituents**

  It contains

  - tannins known as gallotannic acid,
  - gallic acid,
  - ellagic acid,
  - sitosterol,
  - methyl betulate,
  - methyl oleanolate,
  - starch,
  - calcium oxalate,
  - nyctanthic acid,
  - roburic acid
  - syringic acid.

- **Therapeutic efficacy**
  - Galls are used as astringent.
  - It is used for tanning and dyeing.
  - It is also used in the manufacture of ink and tannic acid.

3. ASHWAGHANDHA

- ***Withania somnifera***, known commonly as **ashwagandha** or **winter cherry**,
- **It** is an annual evergreen shrub in the Solanaceae or nightshade family that grows in India, the Middle East, and parts of Africa.
- **Synonym-** Withania root, winter cherry
- **Biological source**

  It consists of the dried roots and stem bases of *Withania somnifera,* belonging to family Solanaceae.
- **Chemical constituents**

  It contain alkaloid
  - withanine as the main constituent
  - somniferine,
  - pseudowithanine,
  - tropine and pseudotropine,
  - hygrine, isopellederine,
  - anaferine,
  - anahygrine
  - The leaves contain steroid lactone, commonly known as withanolides.
- **Therapeutic efficacy**

  to treat
  - nervous disorders,
  - intestinal infections
  - leprosy.
  - tranquillizers
  - nervous exhaustion,
  - debility,
  - insomnia,
  - impotence,
  - infertility

4. TULSI

Synonym- Sacred basil, Holy basil, Tulasi(Telugu)

- **Biological source**

  Obtained from leaves of *Ocimum sanctum* and *Oscimum bassilicum* of family Labiatae

- **Chemical constituents**

  It contains
  - Volatile oil
  - The oil contain
    - → Eugenol
    - → Methyl eugenol
    - → β-Caryophyllene
    - → cineole
    - → linalool

- **Therapeutic efficacy**

  It is having following activity
  - Hypoglycemic
  - Immunomodulatory
  - Antistress
  - Analgesic
  - Anti-pyretic
  - Anti-hypertensive
  - Anti-inflammtory
  - Anti-ulcer
  - Anti-tumour

5. GUGGUL

Synonym- Gumgugul, Salai-gogil, Gum Guggul

- **Biological source**

  Guggal is a gumresin obtained by incision of the bark of *Commiphora mukul* belonging to family Burseraceae.

- **Chemical constituents**
  - Guggal contains gum
  - essential oil
  - sterols (guggulsterols I to VI, β-sitosterol, cholesterol, Z- and E-guggulsterone),
  - sugars (sucrose, fructose),
  - amino acids,
  - α-camphorene,
  - cembrene,
  - allylcembrol,
  - flavonoids (quercetin and its glycosides),
  - ellagic acid,
  - myricyl alcohol,
  - aliphatic tetrols, e
- **Therapeutic efficacy**
  - lowers serum triglycerides and cholesterol as well as LDL and VLDL cholesterols (the bad cholesterols).
  - it raises levels of HDL cholesterol (the good cholesterol),
  - inhibits platelet aggregation,
  - astringent,
  - antirheumatic,
  - antiseptic,
  - expectorant,
  - aphrodisiac,
  - demulcent,
  - as a gargle in teeth disorders, tonsillitis, pharyngitis, and ulcerated throat.