Ginseng

Synonyms Panax; Energofit; Pannag; Ninjin.

Biological Source Ginseng is the dried root of different naturally occurring species of Panax, namely: *Panax ginseng* C.A. Mey or *Aralia quinquefolia* Deene & Planch **(Korean Ginseng);**

Panax japonica **(Japanese Ginseng);** *Panax notoginseng* **(Indian Ginseng)** belonging to family*Araliacea*e.

Geographical Source The plant is found extensively in Korea, Russia and China, but off late it has been cultivated on a large commercial scale in Japan, Canada and United States.

Preparation The plants are usually harvested 3 to 5 years after transplantation. It is usual practice to affect the actual harvesting between July to October.

White Ginseng It is obtained by removing the outer layers of the roots. However, it has been established that the removal of outer layers may tantamount to serious loss of the active components.

Red Ginseng It is obtained by first subjecting the roots to stearning and after that they are dried in an artificial environment between 50-60°C. The *two* types of roots sare subsequently graded and packed.

Description

Colour : Yellowish- brown, white or red

Odour : None

Shape : Tuberous and corpulent

Appearance : Translucent and bears the stem scars.

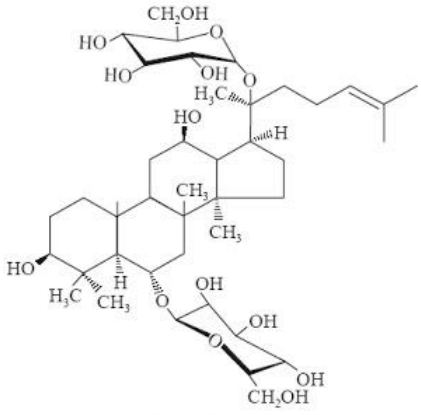
Chemicals Constitutents Ginseng chiefly comprises of a complex mixture of **triterpenoid saponins** which may be either a **steroidal triterpene** or a pentacyclic related to oleonic acid. However, these glyscosides have been classified into *three* major heads, namely:

(*a*) Ginsenosides,

(*b*) Panaxosides, and

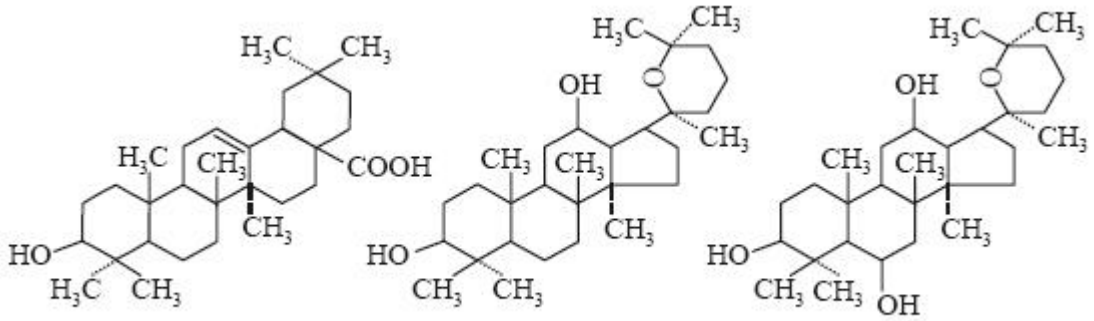
(*c*) Chikusetsu Saponins.

Ginsenoside Rg1, is one of the major saponins that has been isolated and identified in ginseng, with a **steroidal triterpene aglycone** known as (20S)-**protopanaxatriol** as shown below:



Ginsenoside Rg_1

In all, about 13 **ginsenosides** have been isolated and identified. Interestingly, **panaxasides**undergo decomposition yielding *oleanolic acid, panaxadipol* and *panaxatriol* as given below:



Uses

1. In the Chinese system of medicine ginseng is the most favourite remedy for a variety of ailments *e.g.*, as a general tonic, stimulant, carminative and diuretic activities.
2. It also possesses adaptogenic (antistress) properties and is found to exert positive action on the metabolism, the endocrine system and the central nervous system.
3. In the **orient ginseng** is used abundantly in the treatment of anaemia, diabetes, insomnia, gastritis, neurasthenia and specifically to cure sexual impotence.
4. It is found to enhance the natural resistance (*i.e.*, non-specific resistance) and increases the ability to overcome both exhaustion or illness to a great extent.
5. It prolongs the life of elderly persons and cures giddiness.

NEEM

Family: Meliaceae

Botanical name: Azadirachta Indica.

It grows in tropical and semi tropical regions and is widely found in Burma, India and Pakistan. This is a very fast growing, ever green tree which reaches the height of 15 to 20 meters.

Neem is known for its immeasurable medicinal properties and is used as a main ingredient in many home remedies. Commending the medicinal properties of neem, numerous sanskrit names have been coined by our ayurveda acharyas . Few of them are mentioned below.

It is known as Nimba as it boosts health

It is praised as Pichumarda as it destroys skin diseases.

As it is used to ward off evil powers that harm our body , it is known as Arishta

Chemical composition of neem:

Neem tree has numerous medicinal properties by virtue of its chemical compounds. Seeds of the Neem tree contain the highest concentration of Azadirachtin. Apart from Azadirachtin , salannin, gedunin, azadirone, nimbin, nimbidine, nimbicidine, nimbinol, etc are other important liminoids of neem.

.Medicinal properties of Neem:

The Neem tree has many medicinal uses.
The chemical compounds present in neem have anti-inflammatory , antiarthritic ,antipyretic ,hypoglycaemic , Antifungal, spermicidal, antimalarial, antibacterial and Diuretic properties. Flower, leaves, bark and seeds of neem are used in home remedies and in preparation of medicines. Bark of neem acts as antipyretic and helps to reduce fever. Flowers are used in intestinal disorders. Juice from fresh leaves is very helpful in treating skin diseases, wounds and obesity. Oil from neem seeds is used in arthritis, skin diseases and muscular sprains. Neem is very effective in treating gum diseases.

The neem is proved to be beneficial in treating skin diseases because of its antibiotic, antifungal and blood purifying properties. According to ayurveda principles vitiated Kapha and pitta cause skin diseases. Neem pacifies vitiated kapha and pitta, thus helps to cure skin ailments. It promotes wound healing as it is antibacterial and astringent. In psoriasis it reduces itching, irritation, roughness of skin and heals the psoriatic patches. In same way it heals eczema too. It reduces infection and inflammation of acne. Neem helps to maintain the health of scalp skin and prevents dandruff.

kalmegh

English Name: Creat , Green Chirayta, King of bitters.

Common (Indian) Name:

Hindi: Kalmegh, Kiryat, Mahatit,

Family: Acanthaceae

Distribution: Kalmegh is an annual herb found through India, specially in dense forests.It is under cultivation in many states of India.

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Medicinal Properties: According to Ayurveda the plant is bitter, acrid, cooling, laxative, vulnerary, antipyretic, antiperiodic, anti-inflammatory, expectorant, depurative, soporific,

anthelmintic, digestive and useful in hyperdispsia, buring sensation, wounds, ulcers, chronic fever, malarial and intermittent fevers, inflammations, cough, bronchitis, skin diseases, leprosy, colic, flatulence, diarrhoea, dysentery, haemorrhoids etc. Kalmegh is also a reputed Homoeopathic drug. In Bengal (India), household medicine known as "Alui" is prepared from fresh leaves and is given to children suffering from stomach complaints. Recent experimental finding indicated that Kalmegh is having antityphoid and antibiotic properties. It has been proved to be hepatopratective drug.

Chemical Constituents: Kalmegh contains bitter principles andrographolide, a bicyclic diterpenoid lactone and Kalmeghin (upto 2.5%). The leaves contain the maximum active principle content while in the stem it is in lesser amount.

Cultivation: In India, it is cultivated as rainy season (Kharif) crop. Any soil having fair amount of organic matter is suitable for commercial cultivation of this crop. About 400 gms. seed are sufficient for one hectare. The spacing is maintained 30 × 15 cm. No major insect and disease infestation has been reported. The plants at flowering stage (90–120 days after sowing) is cut at the base leaving 10–15 cm stem for plant regeneration. About 50–60 days after first harvest, final harvest is performed. In Indian condition, the yield varies between 2000–2500 Kg dry herb per hectare.

ASWAGANDHA

Ashwagandha is a Rasayana (rejuvenator) herb which helps in promoting ojas. It is a well known stress alleviator herb. It increases physical endurance and helps in regeneration of hormonal system .Ashwagandha in Sanskrit means "horse's smell" which resembles the smell of sweaty horse.The species name somnifera means "sleep inducing " in latin, indicating to its sedating properties.

Morphology: A dense, hairy erect grayish tomentose herb or undershrub. The roots are stout, long tuberous, fleshy, whitish brown and aromatic. The leaves are simple, alternate or sub-opposite, round-oval shaped. The flowers are greenish-yellow and found in few flowered clusters in axils. The fruit is a round orange-red berry, enclosed in green enlarged calyx. The fruit resembles that of red cherries. The seeds are many, yellow kidney shaped and discoid.

Ayurvedic Pharmacodynamic properties:		
Rasa	**:**	Tikta (Bitter), Katu (Pungent), Madhura (Sweet)
Guna	**:**	Laghu (Light), Snigdha (Oily)
Virya	**:**	Ushna (Hot)
Vipaka	**:**	Madhura (Sweet)
Doshakarma	**:**	Kapha-Vatashamak (Alleviates K and V Dosha)

Chemical composition:
The main constituents of Ashwagandha are Alkaloids, Steroidal lactones, Within alkaloids. Withanine is the main alkaloid. Other constituents are amino acids, choline, beta-sitosterol, chlorogenic acid, scopoletin, withaferin etc.

Useful parts: Roots and leaves

Medicinal properties:
It has anti-stress, adaptogenic, aphrodisiac, sedative, diuretic, antispasmodic, germicidal, anti-inflammatory action.
It is a nervine tonic.
It enhances immunity and endurance.
It is a natural nutrient for insomnia
It is good hypnotic in Alcoholism.
It is bitter in taste and hot in potency so it alleviates vata and kapha.
It stimulates thyroid activity.
Enhances anti-peroxidation of liver.

Medicinal uses:

- Ashwagangha is a revitalizing herb that maintains proper nourishment of tisuues, particularly muscle and bones.
- It increases resistance to stress and mainly beneficial in stress related disorders such as arthritis, hypertension, tremors, diabetes, general debility and inflammation. It increases body's resistance towards adverse influence.
- It restores the neurotransmitters and hence useful in various mental disorders.
- It is also used for treating memory loss.
- It support proper function of adrenals and reproductive system.
- As it is powerful aphrodisiac, it is also used for sexual vitality and as an adaptogen.
- It is blood tonifier, that improves circulation and absorption of nutrients from the cells.
- Peroxidation is toxic to the tissues, hence, it is protective to liver.

PHARMACEUTICAL AIDS

"Pharmaceutical aids are the drugs or substances which have no or little pharmacological effect but they are essentially used in the preparation of pharmaceutical dosage forms" (like tablets, injections, emulsions, ointments.)

Class	Examples.
1. Coloring agent	**:** Turmeric, chlorophyll, Caramel, Cochineal insect for red colour.
2. Flavoring agent	**:** Cardamom, cinnamon oil, rose, Orangepeel, Nut-meg
3. Sweeting agent	**:** Honey, Sucrose, Lactose, and Liquorice.
4. Binding agent	**:** Mucilage of Acacia, Mucilage of Tragacanth 2 % starch solution.
5. Diluents	**:** Lactose, starch, Arachis oil, cinnamon water, sesame oil, and Peppermint water.
6. Disintegrating Agent	**:** Isapgol Methylcellulose, Carboxymethylcellulose(CMC), microcrystalline cellulose, psyllium husk
7. Lubricants	**:** Talc, coca butter, and magnesium trisilicate.
8. Emulsifying Agent	**:** Gum tragacanth, agar, and Gum acacia.
9. Suspending agents	**:** Bentonite, Gum tragacanth, Gum acacia
10. Ointment bases	**:** Bee wax, spermaceti, and lanolin, Carnauba wax
11. Thickening agent	**:** Methylcellulose, pectin, Tragacanth

Define Drug: -

"Drugs are those substances which are used in humans or animals either externally or internally for the treatment prevention, diagnosis, mitigation of diseases, it also includes substances which are used to kill of expel warms from G. I. T. or insects & the substances which affect the any fun or structure of body"

Technical Product: -

1) The crude drug which are used as medicine as well as in industry is known as Technical Product. e. g. Papain: It is used for digestion of protein. In industry it is used to prevent chill haze in beer & to make meat soft.

2) Oleoresin of ginger: - It is used as carminative. In soft drink industry used to give particular taste.

3) Starch: It is used as binding agent, disintegrating agent & in halogen poisoning In cloth industry as filler.

Talc (Huashi)

Pulvus Talci

Pharmacutical Name: Pulvus Talci
Mineral Name: 1. Talcum; 2. Hydrous magnesium silicate.
Common Name: Talc, Talcum, Talc powder.
Source of Earliest Record: Shennong Bencao Jing.
Part Used & Method for Pharmaceutical Preparations:
Pulvis Talci is a mineral of silicate that contains mainly hydrated magnesium silicate, chiefly found in the provinces of Shan Dong, Jiang Xi, Jiang Su, and Shan Xi. It is mined and cleaned, then ground into powder or refined with water for use.
Properties & Taste: Sweet or no taste and cold.
Meridians: Stomach and urinary bladder.
Functions: 1. To promote water metabolism and relieve abnormal urination; 2. To clear heat and release summer-heat.
Indications & Combinations:
1. Damp-heat in the urinary bladder manifested as painful urination, urgency of micturition, frequent urination, lower abdominal distention and fever. Talc (Huashi) is used with Clematis stem (Mutong), Plantain seed (Cheqianzi), Common knotgrass (Bianxu) and Capejasmine (Zhizi) in the formula Bazheng San.
2. Boils, eczema, miliaria and skin diseases. Talc (Huashi) is used with Gypsum (Shigao) and Calamine Colamina (Luganshi) externally.

3. Summer-heat and dampness syndrome manifested as thirst, stifling sensation in the chest, vomiting and diarrhea. Talc (Huashi) is used with Licorice root (Gancao) in the formula Liu Yi San.

Dosage: 10-15 g, decocted in water for an oral dose. Appropriate quantity for external use.

Kaolin,

China clay, is nearly white in color. It is distinguished from other industrial clays based on its fine particle size and pure coloring. Its ability to disperse in water make it an ideal pigment.

The primary constituent in kaolin is the mineral kaolinite, a hydrous aluminum silicate formed by the decomposition of minerals such as feldspar.

The name kaolin derives from the Chinese and means high ridge. High ridge is a reference to the hill in south-eastern China where the clay was originally discovered and used. In the 7th and 8th centuries, the Chinese were the first to use kaolin to make porcelain. It was not until centuries later that other areas of the world could duplicate the process.

The white color of the mineral can either be naturally occurring, or can result after processing which removes minerals and other color-bearing compounds. The small particle size of the mineral contributes to its white color by scattering light.

Although kaolin is found throughout the world, deposits with suitable whiteness, viscosity and other favorable characteristics are rare. Ironically, the best deposits are not located in China. The Unites States has high-quality deposits in the Southeast. The mineral has been mined since colonial times in Georgia and South Carolina. Other valuable deposits are located in Brazil and the United Kingdom.

Paper Industry: The primary use of kaolin is in the paper industry. It serves as a paper coating which improves appearance by contributing to brightness, smoothness and gloss. It also improves printability. Additionally, it is used by the paper industry as a filler reducing cost and the use of tree-based resources.

China, Porcelain and Tableware: Many people are under the mistaken impression that the only use for kaolin is in the manufacture of china. This is not true, and its use by the paper industry far exceeds its other uses. However, kaolin still serves as a valuable component in china and other tablewares. Its color, gloss and hardness are ideal characteristics for such products.

Other Uses: Kaolin has a variety of other uses in products including paint, rubber, cable insulation, specialty films and fertilizers. New uses are being discovered frequently, and ensure that the mineral will remain in demand for a long time.

Diatomite, also known as diatomaceous earth, is the naturally occurring fossilized remains of diatoms. Diatoms are single-celled aquatic algae. They belong to the class of golden brown algae known as Bacillariophyceae. Diatomite is a near pure sedimentary deposit consisting almost entirely of silica. The Greeks first used diatomite over 2,000 years ago in pottery and brick.

There are many diatomite deposits throughout the world, but those of high-purity which are commercially viable are rare.

The properties which make diatomite valuable include low density, high porosity, high surface area, abrasiveness, insulating properties, inertness, absorptive capacity, brightness, and high silica content. Diatomite has a wide variety of uses, and is a component in hundreds of products, or vital to the manufacturing process of thousands more.

Filter Aids: The most important use relative of high-quality diatomite is as a filtering media. The naturally occurring fossilized remains of diatoms have innate filtering characteristics due to their unique honeycomb structure. Their filtering qualities are used in beer and wine making, pharmaceutical manufacturing, motor oil processing, and to filter swimming pool water. For almost 100 years diatomite has been the workhorse of food and beverage processing. Almost every shelf in the grocery store contains a product which has been filtered by diatomite.

Functional Additives: In paints, diatomite alters glass and sheen, extends primary pigments, adds bulk and strength, controls permeability and enhances coating adhesion. In plastics, diatomite serves as an antiblocking agent which helps in the separation of plastic parts in manufacturing, and in the separation of plastic bags by the consumer.

Absorbents: Due to such characteristics as porosity and high surface area, diatomite is highly absorbent and is very useful in the clean-up of spills in the automotive, industrial, janitorial and waste remediation industries.

Soil Amendments: When diatomite is incorporated into soil, it serves to reduce compaction, and increase water and air permeation. It also increases plant available water, firms soggy soils, loosens hard to work soils, provides better drainage, aids in nutrient transfer, and improves root growth. In such applications as golf courses, and other landscaped areas it helps absorb and hold water, reducing the amount of water used.

Natural Insecticide: When insects come in contact with diatomaceous earth, it absorbs their protective wax coating and their shells are damaged by the glassy diatoms. This combination causes them to die by dehydration. There is no survival and no built-up immunity as there is with chemical insecticides. Also, it does not break down as chemicals do.

Other examples of the universe of products and uses which benefit from diatomite include dental fillings, seed coatings, roofing compounds, adhesives, sealants, matches, oil drilling compounds, specialty concretes, and paper.

GELATIN

Synonyms Agar-agar; Gelose; Japan-agar; Chinese-isinglass; Bengal isinglass; Ceylon isinglass; Layor carang; Vegetable gelatin.

Biological Source Agar is the dried hydrophilic colloidal polysaccharide complex extracted from the agarocytes of algae belonging to the class *Rhodophyceae*. It is also obtained as the dried gelatinous substance from *Gelidium amansii* belonging to the family *Gelidaceae* and several other species of red algae, such as *Gracilaria* (family: *Gracilariaceae)* and *Pterocladia (Gelidaceae)*. The predominant agar-producing genera are, namely; *Gelidium; Gracilaria; Acanthopeltis; Ceramium and Pterocladia.*

Geographical Source Agar is largely produced in Japan, Australia, India, New Zealand, and USA. It is also found in Korea, Spain, South Africa and in the Coastal regions of Bay of Bengal (India) together with Atlantic and Specific Coast of USA.

Preparation It is an usual practice in Japan where the **red-algae** is cultivated by placing poles or bamboos spread in the ocean which will serve as a support and shall augment the growth of algae on them. During the months of May and October the poles are removed and the algae are carefully stripped off from them. The fresh seaweed thus collected is washed thoroughly in water and subsequently extracted in digestors containing hot solution of dilute acid (1 portion of algae to 60 portions of diluted acid). The mucilagenous extract is filtered through linen while hot and collected in large wooden troughs to cool down to ambient temperature so as to form solid gel. The gel is mechanically cut into bars and passed through a wire netting to form strips. The moisture from the strips is removed by successive **freezing and thawing*** and finally sun dried and stored as thin agar strips.

Alternatively, the mass of gel if frozen and subsequently thawed and the dried agar is obtained by vaccum filtration. The crude agar is usually formed as flakes which can be powdered and stored accordingly.

* To bring down to room temperature from –20 to –30^{o}C.

Description

Colour : Yellowish white or Yellowish grey

Odour : Odourless

Taste : Bland and mucilaginous

Shape : It is available in different shapes, such as: bands, strips, flakes, sheets and coarse powder

Size : Bands: width = 4cm; Length = 40 to 50 cms

Sheets: Width = 10-15cm; Length = 45 to 60 cms

Strips: Width = 4mm; Length = 12 to 15 cms

India produces about 250 MT of good quality agar using *Galidiella accrosa* as the raw material. It is insoluble in cold water in organic solvents. It readily dissolves in hot solutions and it forms a translucent solid mass which characteristic is very useful in microbiology for carrying out the*Standard Plate Count.*

Chemical Constituents Agar can be separated into two major fractions, namely: (*a*) *Agarose*-a neutral gelling fraction; and (*b*) *Agaropectin*—a sulphated non-gelling fraction. The former is solely responsible for the *gel-strength of agar* and consists of (+) –galactose and 3,6-anhydro-(–)-galactose moieties; whereas the latter is responsible for the *viscosity of agar solutions* and comprises of sulphonated polysaccharide wherein both uronic acid and galactose moieties are partially esterified with sulphuric acid. In short, it is believed to be a complex range of polysaccharide chains having alternating α–(1→3) and β–(1-4) linkages and varying *total charge content.*

Chemical Tests

1. It gives a pink colouration with Ruthenium Red solution.
2. A 1.5-2.0% (w/v) solution of agar when boiled and cooled produces a *stiff-jelly*.
3. Prepare a 0.5%(w/v) solution of agar and add to 5 ml of it 0.5 ml of HCl, boil gently for 30 minutes and divide into two equal portions:

(*a*) To one portion add $BaCl_2$ solution and observe a slight whitish precipitate due to the formation of $BaS0_4$ (distinction from Tragacanth), and

(*b*) To the other portion add dilute KOH solution for neutralization, add 2 ml of Fehling's solution and heat on a water bath. The appearance of a brick red precipitate confirms the presence of galactose.

Substituents/Adulterants Gelatin and **isinglass** are usually used as substituents for **agar.**

Uses

1. It is used in making photographic emulsions.
2. It is also employed as a bulk laxative.
3. It is extensively used in preparing gels in cosmetics.
4. It is widely used as thickening agent in confectionaries and dairy products.
5. It is used in the production of ointments and medicinal encapsulations.
6. In microbiology, it is employed in the preparation of bacteriological culture media.
7. It is used for sizing silks and paper.
8. It finds its enormous usage in the dyeing and printing of fabrics and textiles.
9. It is also used as dental impression mould base.
10. It is employed as corrosion inhibitor.

NATURAL COLOURS

Turmeric

Synonyms Curcuma; Indian Saffron; Tumeric.

Biological Source Turmeric is obtained from the rhizome of *Curcuma longa* Linn. (*Curcuma domestica* Valeton) belonging to the natural order *Zingiberaceae*.

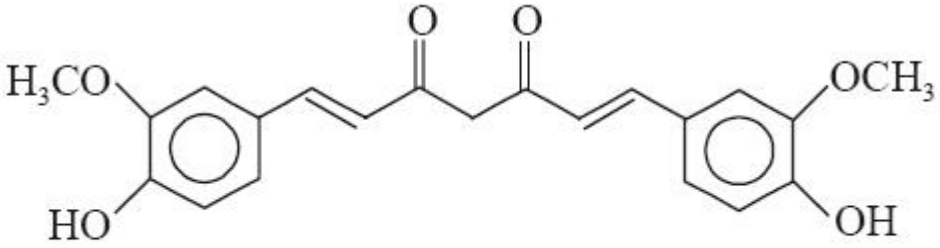
Preparation The plant is normally harvested after 9-10 months when the lower leaves start becoming yellow. The rhizome is carefully dug out from the soil with a blunt knife without damaging it. The fibrous roots are discarded. The raw green **turmeric** is cured and processed by boiling the rhizomes with water for a duration ranging between 12-14 hours. Subsequently, the cooked rhizomes are dried in the sun for 5-7 days. Cooking process helps in achieving *two* objects, namely:

(*a*) Gelatinization of starch, and

(*b*) Yellow colouration, due to *curcumin,* spreads over the entire rhizome.

Characteristic Features Turmeric has an aromatic pepper-like but somewhat bitter taste. It gives curry dishes their characteristic yellowish colouration.

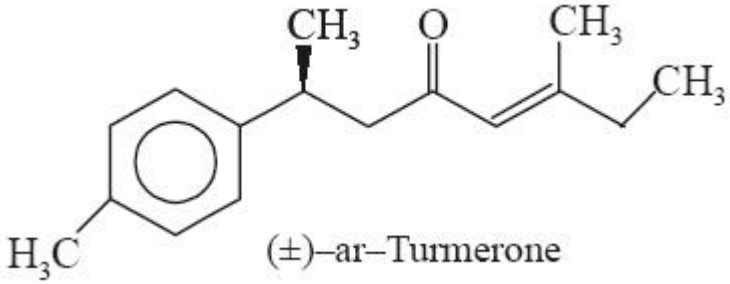
Chemical Constituents It contains volatile oil (5-6%), resin and substantial quantity of**zingiberaceous starch grains.** The marked and pronounced yellow colour in **turmeric** is due to the presence of **curcuminoids** which essentially contains **curcumin** as given below:



Curcumin

(Orange-yellow crystalline powder, mp 183°C)

The **curcuma oil*** obtained from turmeric contains **(±)-ar-turmerone** as given below:



(±)–ar–Turmerone

The volatile oil contains a host of chemical substances, such as: ***d*-α-phellandene, *d*-sabinene, cineol, borneol, zingiberene,** and **sesquiterpenes.**

Turmeric also contains some other chemical constituents, namely: ***p,p*-dihydroxy dicinnamoylmethane; *p*-α-dimethy benzyl alcohol; *p*-hydroxy-cinnamoylferuloylmethane; 1-methyl-4-acetyl-1-cyclohexene;** and **caprylic acid.**

Chemical Tests

1. **Turmeric** powder when triturated with alcohol it imparts a deep yellow colour to the resulting solution.
2. The powdered drug when treated with sulphuric acid it imparts a crimson colour.
3. The aqueous solution of turmeric with boric acid gives rise to a reddish-brown colouration which on subsequent addition of dilute alkali changes instantly to greenish-blue.
4. **Turmeric** powder when reacted with acetic anhydride and a few drops of concentrated sulphuric acid (36 N), it readily gives a violet colouration. Interestingly, the resulting solution when observed under the ultraviolet light (preferably in a **uv-chamber**), it exhibits an intense red fluorescence, which is due to the presence of **Curcumin.**

Uses

1. It is extensively used across the globe as a condiment as curry powder.
2. It is employed as a colouring agent for ointments.
3. It is used medicinally as a tonic, as a blood purifier, as an anthelmintic and finally as an aid to digestion.
4. It is used extennally in the form of a facial cream to improve complexion and get rid of pimples.
5. A small quantity of turmeric when boiled with milk and sugar; it helps to cure common cold and cough symptoms.