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HERBAL MEDICINE: FINDING TRADITIONAL WAYS FOR MODERN PROBLEMS (COVID-19)

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ABSTRACT

Traditional medicine [also known as indigenous or folk medicine] comprises medical aspects of traditional knowledge that developed over generations within various societies before the era of modern science. The WHO defines traditional medicine as " the sum total of the knowledge, skills and practices based on the theories, beliefs, and experiences indigenous to different cultures, whether applicable or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness. World community is facing an unprecedented pandemic of novel corona virus disease[COVID-19] caused by Severe Acute Respiratory Syndrome Corona virus 2 [SARS-COV-2]. The disease has spread globally. The dimensions of pandemic require an urgent harnessing of all knowledge systems available globally. Utilization of Traditional Chinese Medicine in Wuhan to treat COVID-19 cases sets the example demonstrating the traditional health care can contribute to the treatment of these patients successfully. Notwithstanding the fact that no system of medicine has any evidence based treatment for COVID-19 as yet, clinical interventions are required to be put in place. Therefore, Traditional drugs could be implemented and be used in the treatment of COVID-19.

Keywords: Traditional Medicine, COVID-19, SARS-COV-2, Pandemic, TCM.

INTRODUCTION

Corona virus is a large family of enveloped, positive-sense, single strand RNA virus that infect a broad range of vertebrates. They are extensive in bats. The origin of SARS-COV-2 remains unclear. Bats are considered the original source of SARS-COV-2. The spike proteins in the virus will bind to ACE-2, these are located majorly in bronchioles and the other sites such as oral cavity, taste buds and tongue. Vaccines or drugs that specifically target SARS-COV-2 are lacking.

Mechanism of receptor recognition by SARS-COV-2

Spike protein mediates the entry of virus into the host cells. Spike protein of corona virus contain a receptor binding domain [RBD] that recognizes the ACE-2 as its receptor. Receptor binding domain contains core and RBM, and this mediates the contact with ACE-2. The surface of ACE-2 contains 2 virus binding spots. Several RBM surround these spots and regulate infectivity. Pathogenesis is by human-human transmissions. These SARS-COV-2 virus infected people in 2001-2003 and now corona virus are similar to each other. Several residue changes in SARS-COV-2 RBM stabilize 2 virus binding hotspots which increase the affinity of ACE-2 to bind more. The RATG13, a bat COV that is closely related to SARS-COV-2 also uses human ACE-2 as it's receptor.

Location and Distribution of ACE-2

Where the ACE-2 present in the body, there the virus will bind. High ACE-2 is identified in Type II alveolar cells of lungs, esophageal upper and stratified epithelilal cells, absorptive enterocytes from ileum and colon, cholangiocytes, myocardial cells, kidney proximal tubule cells, bladder urothelial cells, these organs are

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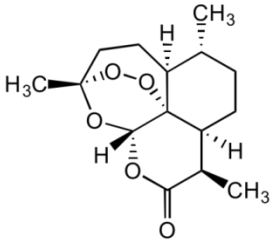
considered as high risk of COVID-19. Function of ACE-2 includes angiotensin -1 converted to angiotensin -2 [vasoconstrictor] in the presence of angiotensin converting enzyme and angiotensin-2 to angiotensin (1-7) [vasodilator]. Here, the angiotensin (1-7) have anti-oxidant, anti-inflammatory activity and can synthesize NO synthaze enzymes.

COVID-19 SYMPTOMS INCLUDES
Most common: Fever, Dry cough, Tiredness.
Less common: Aches and pain, Sore throat, Headache, Loss of taste and smell, Rash on skin, Discolouration of fingers and toes.
Serious symptoms: Difficulty in breathing (or) shortness of breathe, Chest pain (or) pressure, Progressive respiratory failure due to alveolar damage which leads to death.

Traditional Drugs used in the Treatment of COVID-19

1 . ***Artemisia annua:***

Common Name:
Sweet wormwood, Sweetsagewort, Sweet annie, Annual mugwort.
Biological Source: It is a common type of wormwood native to temperate Asia, but naturalized in many countries including scattered parts of North America.
Family : Asteraceae/Compositae.
Chemical Constituents: Sesquiterpenoids including [artemisinin, artemisinin-I, artemisinin-II, artemisinin-III, artemisinin-IV, artemisinin-v, artemisic acid,artemisilactone and epoxyarteannuinicacid (11,14,15)].



Artemisinin

Chemical composition of Artemesia annua: it consists of volatile and non-volatile constituents. Volatile constituents such as essential oils – 0.2-0.25% , main compounds which are about 70% of essential oils appear to be camphene, β-camphene, 1-camphor, iso artemisia ketone, β-caryophyllene and β-pinene. Other minor constituents found in the volatile parts are Artemisia ketone, 1,8-cineole camphene hydrate cuminal. Non volatile ingredients include sesquiterpinoids, flavanoids, coumarins, proteins (β-galactosidase, β-glucosidase), steroids (β-sitosterol and stigmasterol).

Artemisinin is derivative of A.annua that have been commercialized as anti-malarial drugs.

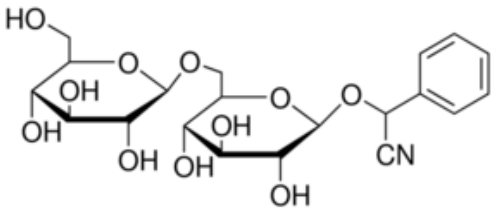
Artemisia annua

As well as the value of artemisinin is not limited to the treatment of malaria, it is most promising natural products that is important candidates accounting for the anti-viral effects. In addition A.annua contain sterols that show virus inhibitory potential. The subset methanolic extracts obtained from aerial parts of A.annua had the highest antiviral activity than acyclovir against Herpes simples virus. A.annua extract exhibits significant anti-oxidant acitivity that is most likely due to its high phenolic content. A.annua derivaties , artesunate is a promising novel drug to treat pulmonary fibrosis by inhibiting pro-fibrotic molecules associated with pulmonary fibrosis.
Uses: It is used in the treatment of cough, commom cold, intestinal and stomach upsets, yellow skin, measles, anxiety, irregular heartbeats, diabetes, and also for parasitic infections. It also has analgesic-antipyretic effect, anti-bacterial effect, anti-inflammatory activities.

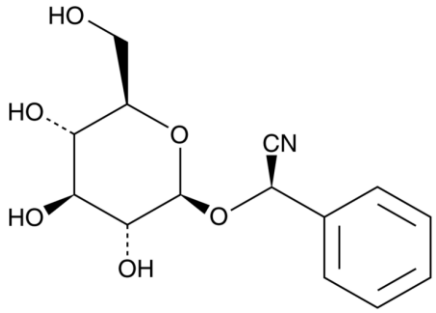
2. ***Semen armaniacae amarum***

Common name: Bitter apricot seed.
Family: Rosaceae.
Biological Source: It is the kernel of Prunusarminiaca. Part of the herb used is ripe seed.

Chemical Constituents:
3.0% Amygladin – [D-amygladin, L-amygladin], Neoamygladin, Prunasin.



Structure of Amygladin



Structure of Prunasin

Mechanism of Action

Semen armaniacae amarum has long been used to control asthma in Korean traditional medicine. Thus oral administration of this drug attenuates asthmatic manifestations including AHR and airway inflammation, which possibly result from selective inhibition of Th2 response to allergen.

Uses : Semen armaniacae amarum is a kind of Traditional Chinese Medicine (TCM) which has been known for the treatment of diseases. It is used to treat a variety of coughs and dyspnea, and treating cough caused by wind heat. It is also used for treating dryness syndrome of the intestines with constipation.

Bitter Apricot Seed

3. *Toona sinensis*

Common name : Chinese mahagony, Chinese cedar, Chinese toon or red toon**.**

Biological source : it is a deciduous plant native to eastern and southeastern Asia, is widely used in Traditional Chinese Medicine.

Family : Meliaceae.

Chemical Constituents: Terpenoids, Phenylpropanoids, Flavanoids, the chemical constituents in the ethanolic extract of the leaves of toona were identified as 6,7,8,2'tetramethoxy 5,6'dihydroxy flavone, 5,7 dihydroxy 8 methoxy flavone, kaempferol, 3-hydroxy 5,6 epoxy 7 megastigmen 9 one, ethyl gallate, scopoletin.

Toona sinensis is a species of toona native to Eastern and Southern eastern Asia, from South Korea through most of eastern, central and South western China to Nepal, Northeastern India, Myanmar, Thailand, Malaysia and Western Indonesia. Parts of toona sinensis used for the medication are fruits , barks and roots.

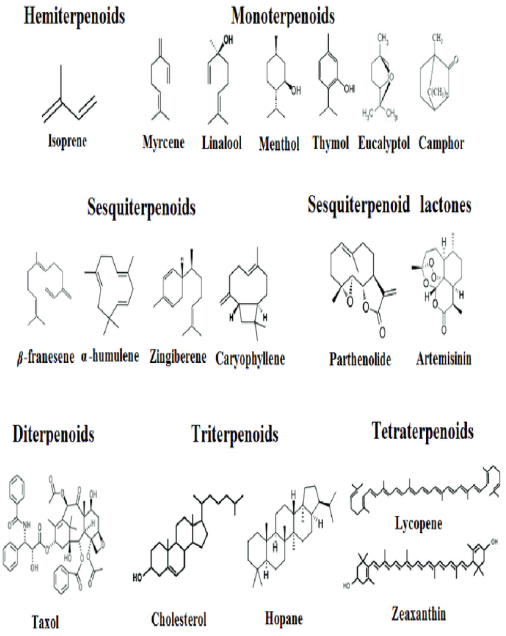
Nutrients In *Toona sinensis*: Ascorbic acid, Calcium, Iron, Vitamin-E, β-Carotene, Folic acid, Gallic acid.

Action of *Toona sinensis*: Anti- cancer, Astringent.

Pharmacological Activities of Toona: Anti- inflammatory effect, Anti-tumoreffect, Anti-oxidant activity, Anti-diabetic effect.It also cures Flatulence, Lung cancer, gonorrhea, Metorrhagia, Leucorrhea.

Common Uses: Leaves of toona sinensis are used to make toona paste. The timber is hard and reddish, it is valuable and used for making furniture and bodies of electric guitar.

DIFFERENT CLASSES OF TERPENOIDS



Toona sinensis

4. Citrus limon:

Common Name: Lemon**.**

Biological Source : Citrus consists of the fresh or dried peels obtained from ripe or nearly ripe fruits of number of citrus spp. Like lemon, citrus lemon; bitter orange. C.aurantium Var. amara; sweet orange, C.aurantium Var sinesis other citrus spp.

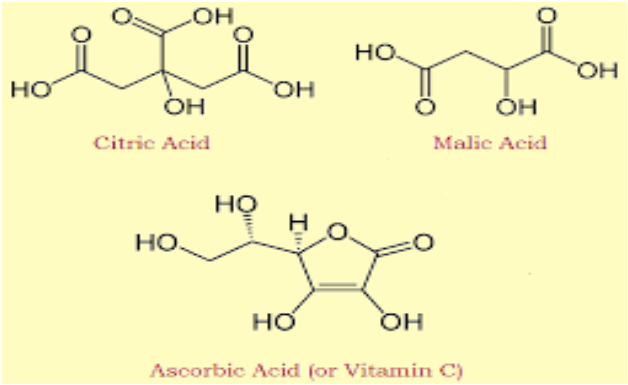
Family : Rutaceae.

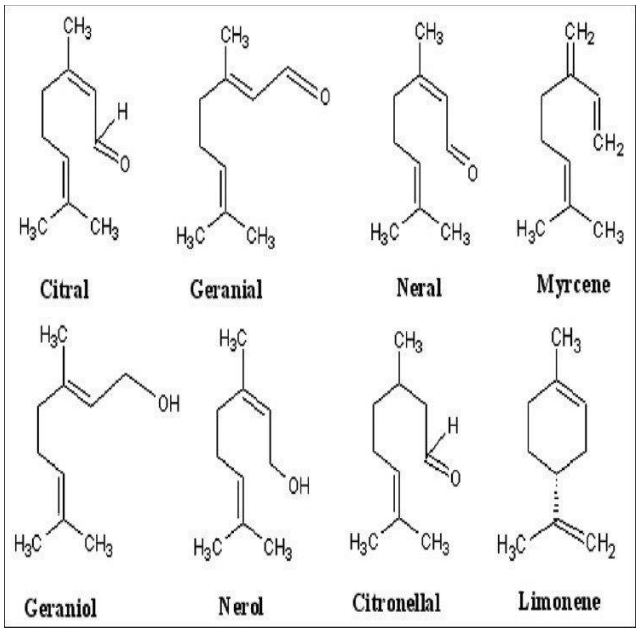
CHEMICAL CONSTITUENTS:

Lemon is a rich source of vitamin C, providing 64% of the Daily Value in a 100 g. Other essential nutrients are low in content. Lemons contain numerous phytochemicals, including polyphenols, terpenes, and tannins. Lemon juice contains slightly more citric acid than lime juice (about 47 g/l), nearly twice the citric acid of grapefruit juice, and about five times the amount of citric acid found in orange juice.

Nine major detected components were found to be: β-Pinene (25.44%), Limonene (39.74%), Linalool (2.16%), α-Terpineol (7.30%), linalyl acetate(3.01%), Acétate geranyl (3.03%), Nerolidol (6.91%), Acetate neryl (1.74%) and Farnesol (4.28%).

Lemon has many bioactive components such as citric acid, Ascorbic acid, minerals, flavonoids and essential oils . Citrus essential oils are generally recognized as safe (GRAS) and a complex mixture of about 400 constituents consisting of 85-99% volatile and 1-15% non-volatile components.





Medicinal uses

The fruit, juice, and peel are used to make medicine. Lemon is used to treat scurvy, a condition caused by not having enough vitamin C. Lemon is also used for the common cold and flu, H1N1 (swine) flu, ringing in the ears (tinnitus), Meniere's disease, stomach upset and vomiting from pregnancy, and kidney stones.

Juice

Lemon juice is used to make lemonade, soft drinks, and cocktails. It is used in marinades for fish, where its acid neutralizes amines in fish by converting them into nonvolatile ammonium salts. In meat, the acid partially hydrolyzes tough collagen fibers, tenderizing it.

Lemon juice is also used as a short-term preservative on certain foods that tend to oxidize and turn brown after being sliced (enzymatic browning), such as apples, bananas, and avocados, where its acid denatures the enzymes.

Peel

In Morocco, lemons are preserved in jars or barrels of salt. The salt penetrates the peel and rind, softening them, and curing them so that they last almost indefinitely.The preserved lemon is used in a wide variety of dishes. Preserved lemons can also be found in Sicilian, Italian, Greek, and French dishes.

The peel can be used in the manufacture of pectin, a polysaccharide used as a gelling agent and stabilizer in food and other products.

Oil

Lemon oil is extracted from oil-containing cells in the skin. A machine breaks up the cells, and uses a water spray to flush off the oil. The oil/water mixture is then filtered and separated by centrifugation.

Leaves

The leaves of the lemon tree are used to make a tea and for preparing cooked meats and seafoods.

Other uses:

Industrial

Lemons were the primary commercial source of citric acid before the development of fermentation-based processes.

Aroma

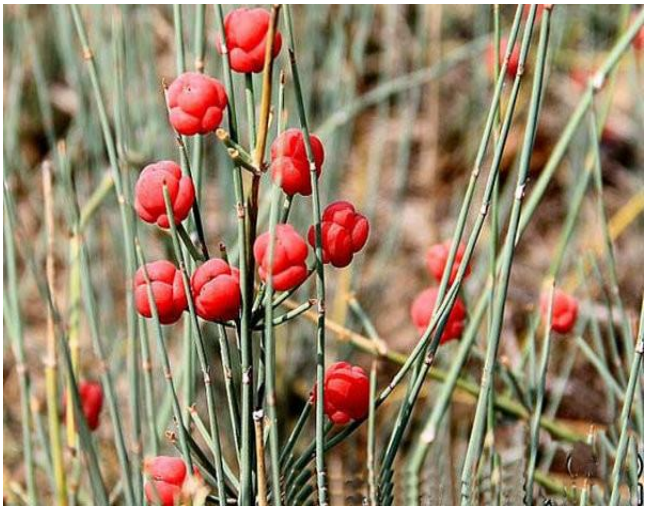
Lemon oil may be used in aromatherapy. Lemon oil aroma does not influence the human immune system, but may contribute to relaxation.

5. Ephedra

Common Name: Ephedra, Ma huang, Pinellia, Yellow astringent, Yellow horse.

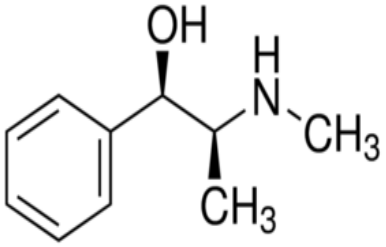
Family: Ephedraceae.

Biological Source: Dried young stems of Ephedra gerardiana (India), Ephedra nebrodensis (India), Ephedra sinica (China), Ephedra equisetine (China).

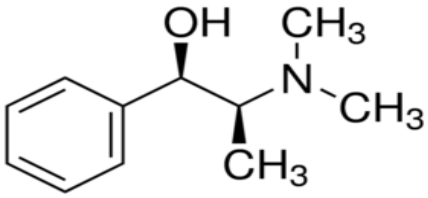


Chemical Constituents: Ephedrine contains amino alkaloids.

1. Ephedrine. 2. Pseudoephedrine. 3. Nor-ephedrine. 4. N-methyl ephedrine. 5. Nor-pseudoephedrine. Ephedrine (C10 H15 NO) is 1-phenyl-1-hydroxy-2-methyl aminopropane. It is soluble in water, alcohol, organic solvents and oils.



Ephedrine



N-methyl ephedrine

Ephedrine a sympathomimetic amine, acts on the part of the sympathetic nervous system. The principle mechanism of action relies on its indirect stimulation of the adrenergic receptor system by increasing the activity of nor-epinephrine at the post synaptic α and β receptors.

USES: It is primarily used to treat asthma, bronchitis, hay fever. It is also prescribed for symptoms of cold and flu, including nasal congestion, cough, fever and chills.

6. *Zingiber officinale:*

Common Name: Ginger**.**
Biological Source: Ginger consists of either the scraped or unscraped rhizomes of zingiber officinale belonging to the family zingiberaceae.

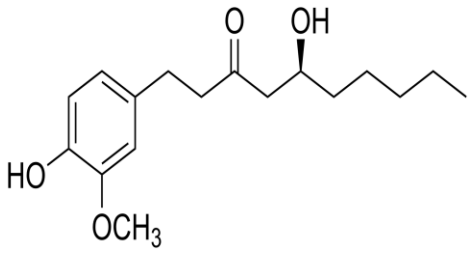
Ginger (Zingiber officinale) is a flowering plant whose rhizome, ginger root or ginger, is widely used as a spice and a folk medicine.[2] It is a herbaceous perennial which grows annual pseudostems (false stems made of the rolled bases of leaves) about one meter tall bearing narrow leaf blades. The inflorescences bear flowers having pale yellow petals with purple edges, and arise directly from the rhizome on separate shoots.

Nutritional information:

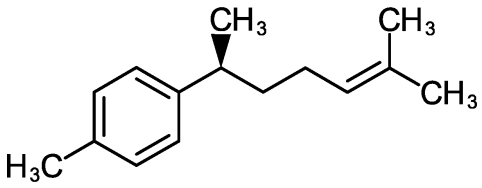
Raw ginger is composed of 79% water, 18% carbohydrates, 2% protein, and 1% fat (table). In 100 grams (a standard amount used to compare with other foods), raw ginger supplies 80 Calories and contains moderate amounts of vitamin B6 (12% of the Daily Value, DV) and the dietary minerals, magnesium (12% DV) and manganese (11% DV).

Chemical Constituents: Chemical analysis of ginger shows that it contains over 400 different compounds. The major constituents in ginger rhizomes are carbohydrates (50–70%), lipids (3–8%), terpenes, and phenolic compounds. Terpene components of ginger include zingiberene, β-bisabolene, α-farnesene, β-sesquiphellandrene, and α-curcumene, while phenolic compounds include gingerol, paradols, and shogaol. These gingerols (23–25%) and shogaol (18–25%) are found in higher quantity than others. Besides these, amino acids, raw fiber, ash, protein, phytosterols, vitamins (e.g., nicotinic acid and vitamin A), and minerals are also present .Ginger, ginger rhizome, and its major active components: 6-gingerol, 6-shogaol, and 6-paradol.

The aromatic constituents include zingiberene and bisabolene, while the pungent constituents are known as gingerols and shogaols [58]. Other gingerol- or shogaol-related compounds (1–10%), which have been reported in ginger rhizome, include 6-paradol, 1-dehydrogingerdione, 6- gingerdione and 10-gingerdione, 4- gingerdiol, 6-gingerdiol, 8-gingerdiol, and 10-gingerdiol, and diarylheptanoids. The characteristic odor and flavor of ginger are due to a mixture of volatile oils like shogaols and gingerols.



Gingerol



Zingiberene

Medicinal Uses

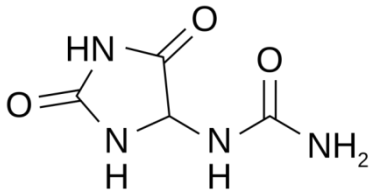
Possibly Effective for

Nausea and vomiting caused by drugs used to treat HIV/AIDS (antiretroviral-induced nausea and vomiting).
Menstrual cramps (dysmenorrhea). Some research shows that taking ginger seems to work about as well as some pain medications, like ibuprofen, mefenamic acid, or Novafen. Adding ginger to medicines such as mefenamic acid also seems to be helpful.
Osteoarthritis. Morning sickness.
Muscle soreness caused by exercise.
Motion sickness. Most research suggests that taking ginger up to 4 hours before travel does not prevent motion sickness.
Insufficient Evidence for
A sudden and serious lung condition (acute respiratory distress syndrome or ARDS).
Lack of appetite in people with cancer.

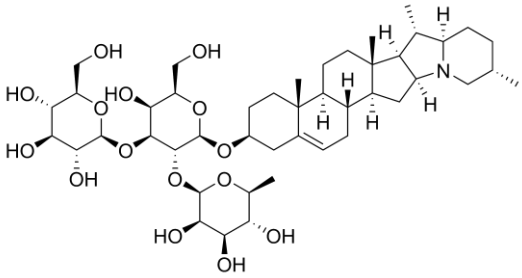
A lung disease that makes it harder to breathe (chronic obstructive pulmonary disease or COPD).
Diabetes. It also treats Indigestion (dyspepsia), hangover, highlevels of cholesterol or other fats (lipids) in the blood (hyperlipidemia), high blood pressure, A long term disorder of the large intestine that causes stomach ache (Irritable bowel syndrome or IBS), Joint pain, Menorrhagia, Migraine, Obesity, Non alcoholic fatty liver disesae (NAFLD). Recovery after surger, Treats anorexia, flu, tooth aches and the other conditions.

7. *Dioscorea batatus:*
Common Name: Chinese yam.
Biological Source: They are tuberous herbaceous perennial lianas, growing to 2–12 metres (6.6–39.4 ft) or more tall.
Family : Dioscoreaceae.

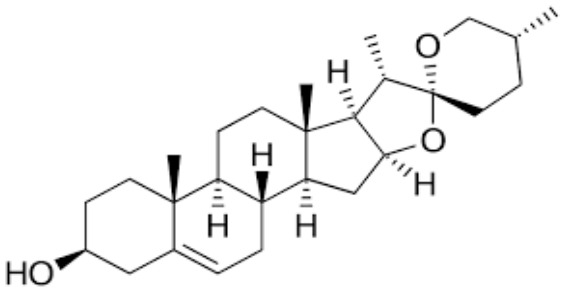
Chemical Constituents:
Allantoin, Flavanoids, Saponins and Phenanthrenes. The yam contains various compounds such as dioscin, diosgenin, steroidal saponins, saponins, gallic acid, vanillic acid, allatoin and protodioscin.



Allantoin



Saponin



Diosgenin

Medicinal Uses

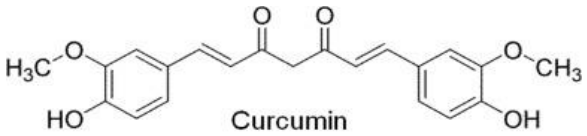
Anti-helmintic, Antidote, Contraceptive, Digestive. Dioscorea batatus is a sweet soothing herb that stimulates the stomach and spleen and has a tonic effect on the lungs and kidneys. The tuber contains allantoin (cell proliferent) which helps in the healing process. The root is an ingredient of “The herb of 8 ingredients”. It helps in the treatment of hyperthyroidism, hepatitis, diabetes. The tuber helps in the treatment of dry cough. It is also used to manufacture the steroidal drugs (progesterone). It is also

used in the treatment of asthma and arthritis and the leaf juice of dioscorea batatus snake bites, scorpion stings.
Edible Uses : Edible parts : fruit and roots. The root contains 20% of starch, 75% of water, 0.1% vitamin- B1, and 10-15 % mg of vitamin-C.

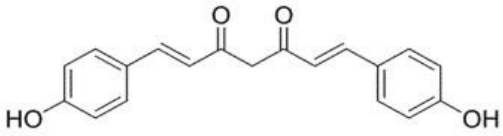
***8. Curcuma longa*:**
Common Name: Turmeric.
Biological Source: Turmeric consists of fresh, dried rhizome of curcuma longa, belonging to family zingiberaceae.
Family: Zingiberaceae.

Chemical Constituents

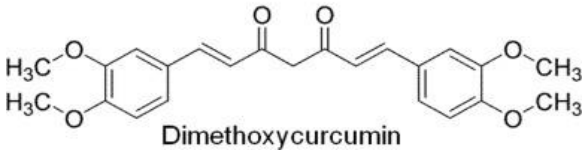
Many principal active ingredients have been found in C. longa including diarylheptanoids (e.g. curcumin, demethoxycurcumin and bisdemethoxycurcumin), sesquiterpenoids (e.g. α-curcumene, β-at-lantone, curcumol and dehydrocurdione), diterpenoids, polysaccharides and phenolic acids. As a part of our ongoing research for biologically active constituents from C. longa, and in order to enrich the chemical constituents of Curcuma, materials in the remaining fractions of C. longa were further fractionated and afforded a new bisabolane-type sesquiterpenoid, (6S)-2-hydroxy-6-[(1′S,5′R)-(4′-methene-5′-hydroxyl-2′-cyclohexen)-2-methylheptan-4-one],
turmerone Q (1), along with six known compounds including three sesquiterpene derivatives (2–4), two diarylheptanoids (5–6) and one diphenyl alkane (7).



Curcumin



Bis-demethoxycurcumin



Dimethoxycurcumin

Medicinal Uses

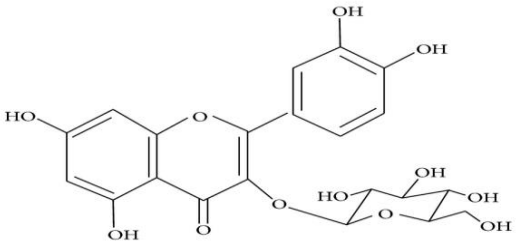
Turmeric is one such herb. Turmeric is used as an herbal medicine for rheumatoid arthritis, chronic anterior uveitis, conjunctivitis, skin cancer, small pox, chicken pox, wound healing, urinary tract infections, and liver ailments Curcuma longa L., is commonly used as a spice in curries, food additive and also, as a dietary pigment. It has also been used to treat various illnesses in the Indian subcontinent from the ancient times. It also treats Acne, Bruising, Diarrhea, Fibromyalgia, Headache, Hepatitis, Jaundice, Liver and gallbladder problems, menstrual problems, Obesity. A painful mouth disease that reduces one's ability to open the mouth (oral submucous fibrosis), Pain, Ringworm and Other conditions.

9. *Houttuynia cordata*
Common Name: Chameleon plant, Fish leaf, Rainbow plant, Bishop's weed.
Family: Saururaceae.
Biological Source: It is a flowering plant nature to Southeast Asia, grows in moist, shady location.

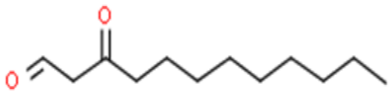
Houttuynia cordata

Chemical Constituents:
Flavanoid glycoside: quercetin-3-O-beta-D-galactoside-7-O-beta-D-glucoside (1), kaempferol-3-O-alpha-L-rhamnopyranosyl-(1 --> 6)-beta-D-glucopyranoside (2), quercitrin (3), hyperin (4), quercetin 3-O-alpha-L-rhamnopyranosyl-7-O-beta-D-glucopyranoside (5), hyperin, rutin, quercetin. Essential oil: methyl-n-noyl ketone, β-myrcene, houttuynin, decanal, trans-caryophyllene, camphe, β-pinene, 4-terpineol etc,.
Alkaloids: trans/cis N-(4-hydroxystyryl) benzamide,7-chloro-6-demethyl-cepharadione, n-methyl ,5 methoxy-pyrolidin-2.

It is already used as a herbal medicine to treat herpes simplex virus, chronic sinusitis and nasal infections.



Flavonoid Glycoside



Houttuynin

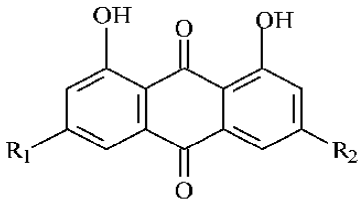
Uses: Treats Pneumonia, Hypertension, Constipation, Hyperglycemia via detoxification. Reduction of heat and diuretic action. Anti-cancer, Anti-obesity, Anti-viral, Anti-bacterial, Anti-leukemic, Anti-allergic, nasal polys activities. Free radical scavenging.

In North-eastern areas like Chinese and Assam the whole plant is taken as salad. Leaf juice is taken for the treatment of cholera dysentery, curing of blood deficiency, and purification of blood. The decoction of this plant is used internally for the treatment of many ailments includes cancer, coughs, fever and externally treats snake bite and skin disorder.

10. *Rheum officinale baill*
Common Name: The Indian rhubarb or Chinese rhubarb.
Biological Source: It is the accepted species and its native range is central china.
Family: Polygonaceae.

Rheum Officinale Baill

Chemical Constituents: Hydroxyanthracene derivatives (2-5%) including emodin, physcione, aloe-emodin and chrysophanol glycosides along with di-O,C-glucosides of monomeric reduced fors and dimeric reduced forms.



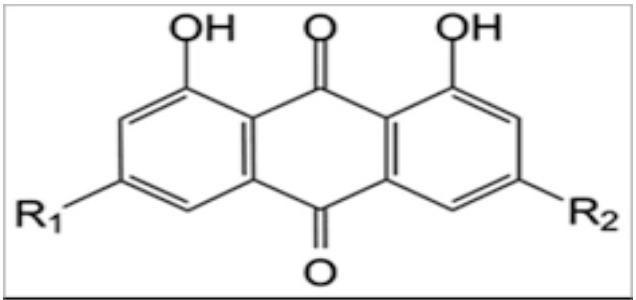
	R_1	R_2
Rhein	H	COOH
Chrysophanol	H	CH_3
Aloe_emodi n	H	CH_2OH
Emodin	OH	CH_3
Phscion	OCH_3	CH_3

Until 1950's, chrysophanol and other anthroquinones were considered to be the constituents producing the purgative action of rhubarb. Current evidence indicates that the major active constituents are the dimeric sennosides A-F(20).
Uses: Anti-inflamattory, Anti- microbial and Hemostatic properties. Rhei has enhanced anti-bacterial activity against menthicillin-resistance staphylococcus aureus.

11. *Polygonum multiforum thunb*
Common Name: Knot weed, Knot grass.
Family: Polygonaceae.

Biological Source: It is the species of flowering plant in the buckwheat family polygonaceae. It is native in central and southern china.

Chemical Constituents:
Quinolones, phospolipids, stilbenes, flavanoids, and other compounds such ascatechin and epicatechin compounds, methylester compounds,etc…, Nine compounds including emodin, chrysophanol, rhein,6-OH-emodin, emodin-8-β-D-glucoside, gallic acid and unknown glycoside which differed in quality and polarity remarkably obtained.



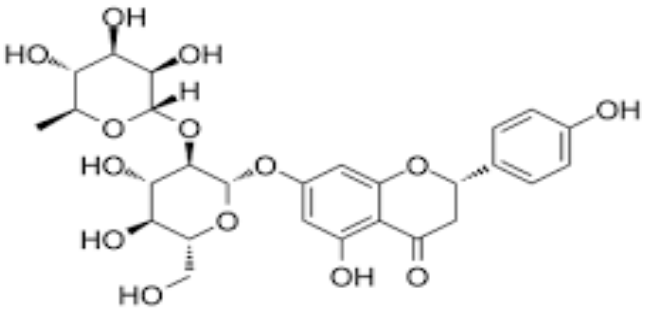
Compound	R1	R2
Aloe-emodin	H	CH_2OH
Chrysophanol	H	CH_3
Danthron	H	H
Emodin	OH	CH_3
Physcion	OCH_3	CH_3
Rhein	H	COOH

Uses: It cures alopexia, facial paralysis and hemiplegia, premature grey hairing, insomnia. It also curesdeficiency syndromes of the lung, cough , dyspnea with cough and phlegm.
Traditional Uses: It acts as a liver tonic and also has hair-blackening effects. It is also useful for the treatment for sore scabies, ring worm and pruritus. Also used in the treatment of scrofula,carbuncles and postpartum and morbid leucorrhea and to reinforce the kidney and promote anti-aging effects.

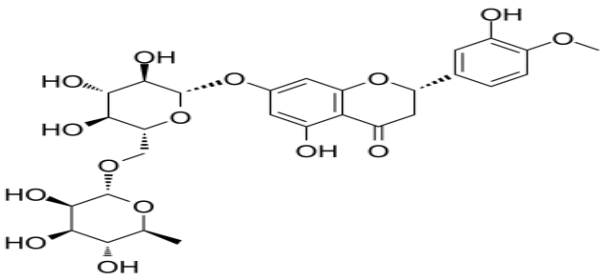
12. *Fructus auranti*:

Common Name : Bitter orange flower, Bitter orange peel, Citrus aurantium.
Family: Rutaceace.
Biological Source: It is the native to Southeast Asia and has been spread by humans to many parts of the world. It is probably a cross between the pomelo, Citrus maxima and the mandarin orange, citrus reticulate.

Fructus auranti is derived from the dried, unripe fruit of citrus aurantium L is one of the commonly used Traditional Chinese Medicine to treat gastro intestinal motility dysfunction diseases.
Chemical Constituents: It has four kinds of flavanoids: Naringin, Neohesperidin, Waringenin, and Hesperidin, Synephrine. Bitter orange (synephrine) is considered as a banned substance by National CollegiateAtheletic Association (NCAA).



Naringin



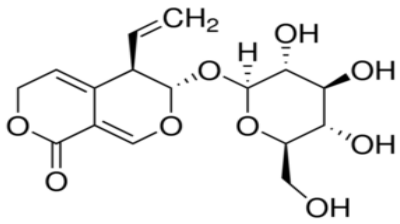
Hesperidin

Uses: People use bitter orange for obesity, athletic performance, indigestion (dyspepsia), premenstrual syndrome, but there is no good scientific evidence to support its use. It is also used for before the surgery, used to treats anxiety, cold, insomnia, eye swelling.

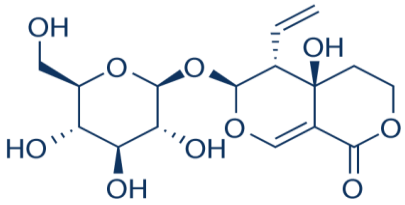
13. *Genetiana scabra*

Common Name: Long dan cao, Japanese gentian.
Family: Gentianaceae.
Biological Source: It grows in the climatic conditions of China, Japan, South Korea, Russia, North America. The flowers in mid summer,autumn,blue or dark blue colour. It belongs to the family gentianaceae and gentiana genus.

Chemical Constituents
Glycosides : secoiridoidal and iridiod glycosides such as gentiopicroside, swetiamarin, ioganin, ioganic acid. **Alkoloid**: gentiopicroside, xanthones,monoterpenes, polyphenols and flavones.
Five triterpenoids :(20S)-dammara-13(17)24-dien-3-one(20R)-dammara-13(17)24-dien-3-one, chirat-16-en-3-one, chirat-17(22)-en-3-one and 17β,21β-epoxyhopan-3-one, were isolated from the rhizomes and roots of Gentiana scabra together with 5 known ones, chiratenol, hop-17(21)-en-3-one, hop-17(21)-en-3β-ol, lupeol and α-amyrin**.**
Phenolic compounds: Two new (1 and 2) and seven known phenolic compounds were isolated from a methanol extract of the rhizomes and roots of Gentiana scabra. Theirstructures were identified by spectroscopic analysis and comparing with reported values.The inhibitory effects of each compound on soluble epoxide hydrolase (SEH) were evaluated.



Gentiopicroside



Swetiamarin

Uses: Gentiana scabra roots are used as a bitter tonic in Chinese herbalism where it is said to promote digestive secretions and treats a range of illnesses associated with the liver. The root is antibacterial and stomachic. It is used in the treatment of anorexia, dyspepsia, jaundice, leucorrhoea, eczema, conjunctivitis, sore throat, acute infection of the urinary system, hypertension with dizziness and tinnitus. The root is harvested in the autumn and dried for later use. This species is one of several that are the source of the medicinal gentian root. Gentian root has a long history of use as a herbal bitter in the treatment of digestive disorders and is an ingredient of many proprietary medicines. It contains some of the most bitter compounds known and is used as a scientific basis for measuring bitterness. It is especially useful in states of exhaustion from chronic disease and in all cases of debility, weakness of the digestive system and lack of appetite. It is one of the best strengtheners of the human system, stimulating the liver, gall bladder and digestive system, and is an excellent tonic to combine with a purgative in order to prevent its debilitating effects. The root is anthelmintic, anti-inflammatory, antiseptic, bitter tonic, cholagogue, emmenagogue, febrifuge, refrigerant, stomachic.It is taken internally in the treatment of liver complaints, indigestion, gastric infections and anorexia. It should not be prescribed for patients with gastric or duodenal ulcers. It is quite likely that the roots of plants that have not flowered are the richest in medicinal properties.

CONCLUSION

With the appearance of COVID-19 outbreak many scientific researchers and clinicians tried to propose effective drugs for eradication of this pandemic disease. Traditional medicines with 1000 years' experience in the prevention of pandemic and endemic infectious diseases are worth learning andproviding alternative candidate for controlling of patients with COVID-19 infection. Nowadays, there are no effective treatment for COVID-19, as a result it provides a biggest opportunity to test different plants and decoction for management of this disease. Hopefully, positive results from clinical trial experiments elucidate the positive effects of these traditional medicine alone and in combination with western medicine to recovery of SARS-CoV-2. This suggests the further studies on the Chinese and Indian medicine would be needed to discover the novel anti-COVID-19 substances useful for eradication of SARS-CoV-2. It highlight the ways that the herbal-based medicines may be efficient to overcome COVID-19infections.

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