



A review on hebral remedies used for viral infection, HIV and liver disorder

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Abstract

The rising number of patients with viral infection, HIV, and liver disorder was noticed due to overwhelming usage of drugs has paved the path for researchers in an interest in herbal medicines. These diseases still remain an area of medicine for which specific treatments are lacking. Herbal medicines provide rational means for the treatment of these diseases. Herbal medicines can be developed as a safe, effective and economical alternate. The herbal drugs which are used for treatment of viral infection are Ginseng, Tobacco, Hypercium, Eucalyptus, Peppermint etc. The herbal drugs which are used for the treatment of AIDS are Kalmegh, Betel nut, Turmeric, Clove, Liquorice etc. The herbal drugs which are used for the treatment of Liver disorders are Liquorice, Milk thistle, Liv-52, Green tea etc.

Many compounds of plant origin that inhibits various stages of cell cycle which includes several alkaloids, carbohydrates, coumarine, flavanoids, lignin, phenolics, proteins, cunnins, xanthenes, phospholipids and tannins. These candidates have the potential to come up as a drug for treatment for various diseases.

So the aim of this review article is to identify plants and their active principles possessing activities against Viral infection, HIV, and Liver disorders with the objective of providing an effective approach for prevention of transmission and treatment of these diseases.

Keywords: medicinal plants, herbal remedies, hiv, liver disorder, viral infection

1. Introduction

1.1 Herbal Medicines

Herbalism is a traditional medicinal or folk medicine practice based on the use of plants and plant extracts. Herbalism is also known as botanical medicine, medical herbalism, herbal medicine, herbology, and phytotherapy. Sometimes the scope of herbal medicine is extended to include fungi and bee products, as well as minerals, shells and certain animal parts. Many plants synthesize substances that are useful to the maintenance of health in humans and other animals. These include aromatic substances, most of which are phenols or their oxygen-substituted derivatives such as tannins. Many are secondary metabolites, of which at least 12,000 have been isolated — a number estimated to be less than 10% of the total. In many cases, these substances (particularly the alkaloids) serve as plant defense mechanisms against predation by microorganisms, insects, and herbivores. Many of the herbs and spices used by humans to season food yield useful medicinal compounds [22, 30].

Herbal medicine, or phototherapy, is the science of using herbal remedies to treat the sick. It therefore covers everything from medicinal plants with powerful actions, such as Digitalis and Belladonna, to those with very gentle action, such as chamomile, mint and many others. It should be noted that 'very gentle' action, when referring to chamomile or mint, does not mean they are more or less ineffective, but rather that one would not expect these plants to produce instant and powerful effects like those seen, for instance, after an injection

of digitalis or strophanthin. 'Gentle' action also means that these 'simple' medicinal plants do not as a rule have any appreciable toxic effects, and may therefore be safely taken over an extended period of time.

1.2 Viral infection

A virus is a tiny organism that causes an infection in the body. Viruses are made up of the genetic material known as DNA or RNA, which the virus uses to replicate. In order for a virus to survive, it must invade and attach itself to a living cell. It will then multiply and produce more virus particles by attaching itself to a host cell, the virus may either kill or alter the cell's functions. When the cell dies, new types of viruses are released, and they infect other cells. This is how viruses cause disease. Generally, viruses will only infect one type of cell. For example, the cold virus will only infect cells of the upper respiratory tract. Viruses can be transmitted in numerous ways, such as through contact with an infected person, swallowing, inhalation, or unsafe sex. Factors such as poor hygiene and eating habits can increase your risk of contracting a viral infection. The external barriers, such as the skin and mucous membranes, are the first line of defense. The body's immune defenses are triggered when the virus enters the body, and white blood cells (lymphocytes and monocytes) begin to attack and destroy the virus.

Antibiotics are generally useless against viruses; they work most actively against bacteria. Since the discovery of penicillin in 1928, mainstream medicine has come up with

dozens of antibiotics. But today we still have only a handful of antiviral drugs, among them acyclovir for herpes, AZT for AIDS and interferon, the body's own virus fighter.

2. Antiviral Agents

Virus diseases still remain an area of medicine for which specific treatments are lacking. Some drugs can prevent replication of the virus within the living cell. The pick rate of the growth of the virus is usually over before the clinical symptoms appear. Treatment is often symptomatic. For some

diseases, e.g., various types of influenza, vaccines are available.

A virus is a microscopic particle that can infect the cells of a biological organism. Viruses can only replicate themselves by infecting a host cell and therefore cannot reproduce on their own. At the most basic level, viruses consist of genetic material contained within a protective protein coat called a capsid. They infect a wide variety of organism: both eukaryotes (animals, yeasts, fungi and plants) and prokaryotes (bacteria) ^[4].

2.1 Types of virus ^[20]

Table 2: Types of virus

S. No	Species	Indication
1	Herpes simplex	Eye infections, skin diseases, encephalitis and Genital infections.
2	Influenza A, B & C viruses	Influenza A, B & C
3	Rabies viruses	Rabies, encephalitis
4	Enteroviruses	Poliomyelitis
5	Para influenza virus	Para influenza
6	Variola, Vaccinia	Smallpox, Cowpox
7	Varicella-zoster	Varicella(zoster), Herpes zoster
8	Rhinoviruses	Respiratory diseases

2.2 Herbal Remedies for viral infections ^[4]

Table 3: Herbal Remedies for viral infections

S.No.	Plant name	Family	Part	Virus
1.	Narcissus tazetta	Amarylidaceae	Plant	Raucher leukemia
2.	Picalima nitida	Apocynaceae	Root	Herpes
3.	Amorphophallus-campanulatus	Araceae	Leaf	Columbia SK
4.	Panax ginseng	Araliaceae	Root	Semliki forest
5.	Matricaria inodora	Asteraceae	Plant	Herpes
6.	Raphanus sativus niger	Brassicaceae	Root	Influenza A
7.	Luffa cylindrical	Cucurbitaceae	Vine	Vesicular stomatitis
8.	Trichosanthes anguina	Cucurbitaceae	Plant	Jpn encephalitis
9.	Phyllanthus amarus	Euphorbiaceae	Plant	Hepatitis
10.	Amanoa oblongifolia	Euphorbiaceae	Plant	Cytomegalovirus
11.	Calophyllum inophyllum	Clusiaceae	Bark	Columbia SK
12.	Cassia senna	Papilionaceae	Leaf	Herpes
13.	Melia azedarach	Meliaceae	Leaf	Tacaribe
14.	Eucalyptus cinerea	Myrtaceae	Oil	Influenza A
15.	Piper guineense	Piperaceae	NS	Herpes
16.	Securidaca-longipedunculata	Polygalaceae	Root, Bark	Herpes
17.	Coptis jaenica	Ranunculaceae	Root	Herpes
18.	Rhamnus eurshiana	Rhamnaceae	Bark	Herpes
19.	Nicotiana tabacum	Solanaceae	Leaf	Encephalomyocarditis
20.	Balanites aegyptica	Zygophyllaceae	Root, Bark	Herpes
21.	Thuja occidentalis	Cupressaceae	Leaf	Herpes
22.	Hoslundia opposite	Lamiaceae	Flower	Herpes zoster
23.	Echinaceae purpurea	Asteraceae	Flower	Rhinovirus
24.	Hypericum perforatum	Hypericaceae	Flower	Influenza A & B
25.	Sambucus nigra	Caprifoliaceae	Flower	Rhinovirus
26.	Melissa officinalis	Labiatae	Leaf	Herpes
27.	Calendula officinalis	Compositae	Flower	Rhinovirus
28.	Mentha X pipertia	Labiatae	Oil	Rhinovirus
29.	Astragalus-membranaceus	Leguminosae	Root	Influenza
30.	Apium graveolens	Umbelliferae	Fruit	Influenza
31.	Hydrastis Canadensis	Ranunculaceae	Root	Influenza
32.	Tabebuia avellanadae	Bignoniaceae	Bark	Influenza

2.3 Description of herbs

2.3.1. Ginseng ^[21]

Biological Source: It is the dried root of various species of *Panax ginseng*.

Family: Araliaceae.

Macroscopic Characters

Colour: Yellowish brown, white or red in colour.



Fig 1: Ginseng roots

Chemical Constituents: Ginseng contains a mixture of several saponin, glycosides, belonging to triterpenoid group. They are grouped as follows:

- Ginsenosides
- Panxaspsides
- Chikusetsusaponin

Ginsenosides contain aglycone dammarol while panaxosides have oleanolic acid as aglycone.

MOA: Ginsenosides showed no protective effect against Coxsackie B5 virus in MK2 cell cultures. However, they decreased the susceptibility of the fourth to tenth cultures of cells to the virus. A reduction in virus titre was noted in the sixth culture. The plant bufadienolide scillarenin inhibited replication of rhinoviruses and polio virus [8].

Uses: It is useful in adrenal and thyroid dysfunctioning. It is an important immunomodulatory drug. It is used as aphrodisiac. It is used as demulcent and in gastritis and anaemia. Ginseng extracts are also used externally in cosmetics.

2.3.2. Eucalyptus [7]

Biological Source: Eucalyptus oil is the volatile oil obtained by the distillation of the fresh leaves of *Eucalyptus cinerea*.

Family: Myrtaceae.

Macroscopic Character

Colour: Colourless or pale-yellow liquid

Odour: Aromatic and camphoraceous

Taste: Pungent

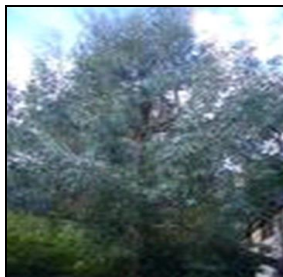


Fig 2: Eucalyptus leaves

Chemical Constituents: Eucalyptus oil chiefly contains cineole, also known as eucalyptol (about 80%). It also

contains pinene, camphene and traces of phellandrene, citronellal, geranyl acetate.

MOA: The mechanism of action of quinones from the roots of *Salvia officinalis* L. (royleanones) and terpenoid phenolaldehydes from the leaves of *Eucalyptus viminalis* Labill. (euvimals) was studied. Royleanones and euvimals displayed marked protonophoric activity on artificial bilayer lipid membranes in vitro, and exerted an uncoupling action on oxidative phosphorylation in isolated rat liver mitochondria. The results suggest that biological membranes are the primary targets of royleanones and euvimals, and the protonophoric activity may contribute to the cytotoxicity and antimicrobial properties of these compounds [1].

Uses: It is used in treatment of fever. Steam inhalation of the vapor of its oil; help to treat asthma, bronchitis, whooping cough, and emphysema.

2.3.3. Tobacco [29]

Biological Source: This consists of dried leaves of *Nicotiana tabacum*.

Family: Solanaceae

Macroscopic Character

Colour: Green or slightly brown

Odour: Characteristic

Taste: Bitter

Size: 60 to 80 cm



Fig 3: Tobacco leaves

Chemical Constituents: The tobacco contains pyridine-piperidine type of alkaloids, (0.5 to 1.5%) among which the most prominent is nicotine. The other alkaloids are normicotine and anabasine.

MOA: The antiviral activity of a water-soluble fraction of tobacco leaves has been reported. When given intraperitoneally to mice infected with encephalomyocarditis virus, the extract exerted both prophylactic and therapeutic effects by protecting the animals from fatal paralysis. It was also active against lymphocytic choriomeningitis virus in mice.

Uses: Nicotine exerts stimulant effect on heart and nervous system. It is used as an insecticide and fumigant. It is used as a stomach poison in combination with bentonite. It possesses a unique action on autonomic ganglia which it stimulates and depresses ultimately leading to paralysis.

2.3.4. Peppermint ^[12]

Biological Source: The oil is obtained by steam distillation of the fresh flowering tops of the plants known as *Mentha piperita*.

Family: Labiatae

Macroscopic Character

Colour: Colourless to

Odour: Characteristic and pleasant

Taste: Pungent



Fig 4: Peppermint leaves

Chemical Constituent: Peppermint oil contains chiefly l-menthol. Other constituents of the peppermint oil are menthone, menthofuran, jasmone, menthyl isovalerate, menthyl acetate and terpene derivatives. The other terpenes include l-limonene, isopulegone, cineole, pinene, camphene, etc.

MOA: Peppermint oil acts as a choleric, stimulating the flow of bile, which improves digestion. Peppermint oil also has antiviral properties, inhibiting many viruses that cause digestive problems. The strong antiviral properties of peppermint are most concentrated in the tea form, and drinking it will restrict the growth of many cold and flu viruses. It is also very effective for a dry cough, because it calms the throat muscles, and as an expectorant, because menthol thins the mucus ^[13].

Uses: Peppermint is widely used for its antispasmodic, antiseptic, carminative, anesthetic, and choleric properties. It aids digestion and is held to be helpful for many stomach problems, irritable bowel syndrome, nausea, morning sickness, dysmenorrhea, diarrhea, constipation, and flatulence. In larger doses, it may have an emmenagogic effect. A combination of peppermint oil's analgesic and antispasmodic properties also make it an effective remedy for headaches.

2.3.5. Hypericum ^[4]

Biological Source: It consists of dried aerial parts of plant *Hypericum perforatum*.

Family: Hypericaceae

Macroscopic Characters

Colour: Green

Odour: Distinct

Taste: Astringent and bitter



Fig 5: Hypericum plant

Chemical constituents: It contains naphthodianthrones hypericin and pseudohypericin, hyperoside and flavonoids. Hypericins (0.06 to 0.75%) include hypericin red fluorescent pigment, pseudohypericin and hyperforin. Herb also contains tannins, resinous substance, rutin, alkaloids, fixed oils, vitamin C and hyperin. Fixed oil contains phytosterol and hydrocarbons.

MOA: It acts by;

1. Monoamine oxidase (MAO) inhibition
2. Inhibition of serotonin reuptake.
3. Inhibition of gamma-aminobutyric acid
4. Inhibition of interleukin-6(IL-6).

Uses: 1. Hypericum is used as an antidepressant.

2. It is used for its antiviral activity against HIV and hepatitis-C virus.

3. Anti-Hiv Agents ^[4]

Acquired immunodeficiency syndrome (AIDS) has been a serious life-threatening health problem since 1981 and is the most quickly spreading disease of the 20th century. Since the epidemic began, more than 60 million people have been infected with the virus. HIV/ AIDS are now the leading cause of death in sub-Saharan Africa. Worldwide, it is the fourth biggest killer. On account of recent reports of WHO and UNAIDS, at the end of 2001, an estimated 40 million people globally were living with HIV, out of them about 22 million people had died. The most affected is the sub-Saharan Africa where 2.3 million people were killed by AIDS in 2001. In many parts of the developing world, the majority of new infections occurred in young adults, with young women especially vulnerable.

A pathogenic human retrovirus is the etiological agent causing the AIDS disease. The virus has been called human T-cell Immunodeficiency virus type III (HTIV-III), lymphadenopathy associated virus (LAV) and AIDS-related virus (ARV). HIV not only invades the immune system through an interaction with the CD4 receptors on T-helper cells, but also

infests macrophages/ monocytes. Loss of the helper- inducer (CD4+) T cells results in profound immunosuppression, and subsequently leads to the development of neoplasm's (e.g., Kaposi's sarcoma), opportunistic infections (e.g., Pneumocystis carinii pneumonia) and neurological complications [4]. AIDS has become a pandemic disease of profound international concern. The disease is seen with

increasing frequency throughout the world. At the World Health Organization, over 288337 cases have been documented worldwide in November 1990. There are generally three broad approaches to the treatment: The use of anti-HIV agents to destroy the virus or control viral growth; Immunotherapy to restore the impaired immune functions; and Treatment of specific opportunistic infections or tumors.

3.1 Herbal Remedies for HIV [4]

Table 4: Herbal Remedies for HIV

S. No.	Plant Name	Family	Part of Use
1	Acer okomotoanum	Aceraceae	Leaf
2	Andrographis paniculata	Acanthaceae	Leaf
3	Annona glabra	Annonaceae	Fruit
4	Ardisia japonica	Myrsinaceae	Aerial
5	Ancistrocladus korupensis	Ancistrocladaceae	Leaf
6	Arctium lappa	Asteraceae	Root
7	Artemisia annua	Asteraceae	Leaf
8	Callophyllum lanigerum	Clusiaceae	Fruit
9	Castanospermum australe	Papilionaceae	Seeds
10	Celastrus hindsii	Celastraceae	Seed
11	Chassalia parvifolia	Rubiaceae	Bark
12	Conospermum incurvum	Proteaceae	Stem
13	Crataegus pinatifida	Rosaceae	Leaf
14	Croton tiglium	Euphorbiaceae	Seed
15	Curcuma longa	Zingiberaceae	Rhizome
16	Evodia roxburghiana	Rutaceae	Fruit
17	Ferula sumbul	Apiaceae	Root
18	Ganoderma lucidum	Polyporaceae	Fruit
19	Garcinia multiflora	Clusiaceae	Leaf
20	Gelonium multiflorum	Euphorbiaceae	Seed
21	Glycyrrhiza lepidota	Papilionaceae	Leaf
22	Homalanthus nutans	Euphorbiaceae	Steam
23	Hopea malibato	Dipterocarpaceae	Leaf
24	Hypericum perforatum	Hypricaceae	Aerial
25	Kadsura lancilimba	Sehisandraceae	Root
26	Leitneria floridana	Leitneriaceae	Seed
27	Lepidobotrys staudti	Lepidobotryaceae	Stem
28	Litsea verticillata	Lauraceae	Leaf
29	Maclura tinctoria	Moraceae	Fruit
30	Maprounea Africana	Euphorbiaceae	Fruit
31	Marila laxiflora	Clusiaceae	Stem
32	Mordica charantia	Cucurbitaceae	Seed
33	Myrianthus holstii	Moraceae	Fruit
34	Palicourea condensate	Rubiaceae	Bark
35	Phyllanthus myrtifolius	Euphorbiaceae	Fruit
36	Polyalthia suberosa	Annonaceae	Stem
37	Pothomorphe peltata	Piperaceae	Fruit
38	Schisandra sphaerandra	Schisandracea	Steam
39	Stephania cepharantha	Menispermaceae	Root
40	Symphonia globulifera	Clusiaceae	Stem
41	Symplocos setchuensis	Symplocaceae	Bark
42	Syzygium claviflorum	Myrtaceae	Seed
43	Terminalia bellerica	Combretaceae	Fruit
44	Terminalia chebula	Combretaceae	Fruit
45	Toddalia asiatica	Rutaceae	Root
46	Trichosanthes kirilowii	Cucurbitaceae	Root
47	Tripterygium wilfordii	Celastraceae	Root
48	Wikstroemia indica	Thymelaeaceae	Root
49	Xanthoceras sorbifolia	Sapindaceae	Leaf
50	Castanos permum austracle	Leguminoseae	Seed

51	<i>Tripterigium wilfordii</i>	Celastraceae	Root
52	<i>Hypoxis hirsute</i>	Hypoxidaceae	Rhizome
53	<i>Sutherlandia frutescens</i>	Sutherlandiaceae	Flowers

3.2 Description of herbs

3.2.1. Turmeric ^[7]

Biological Source: It consists of dried as well as fresh rhizomes of *Curcuma longa*.

Family: Zingiberaceae

Macroscopic Character

Colour: Yellowish-brown

Odour: Characteristic

Taste: Slight bitter taste

Shape: Cylindrical and short branch



Fig 6: Turmeric rhizomes

Chemical Constituent: It contains 5% of volatile oil, resin, abundant zingiberaceous starch grains and yellow colouring substances known as curcuminoids. The chief component of curcuminoids is known as curcumin. Curcumin is responsible for yellow colour.

MOA: Apolysaccharide fraction of the drug has a marked immunological activity. The new acid glycans designated ukonan A, B and C show remarkable reticuloendothelial system potentiating properties. Ukonan A is composed of L-arabinose, D-xylose, D-galactose, D-glucose, L-rhamnose and D-galacturonic acid.

Uses: Turmeric is used in Indian medicine as an aromatic, stomachic and diuretics and to treat jaundice and hepatitis. The choleric activity of curcumin was described in in vitro experiments have now demonstrated the strong antihepatotoxic action of the cucuminoids.

3.2.2. Artemisia ^[21]

Biological Source: This consists of Chinese traditional herb *Artemisia annua*.

Family: Asteraceae

Macroscopic Character

Colour: Dark green

Odour: Aromatic

Taste: Bitter

Size: 5 to 7 cm



Fig 7: Artemisia plant

Chemical Constituents: It contains artemisinin, deoxyartemisinin 1%. It is sesquiterpene lactones with an internal peroxide linkage. Artemisinic acid, arteannuin A and B, are the other constituents of drugs. Volatile oil 0.3 to 0.4% with artemisia alcohol, artemisia ketone, camphor, caryophyllene and myrcene are present in the drug.

Uses: It shows ant malarial effects by its rapid blood schizonticidal activity. It is used in treatment of cerebral malaria. It is also shows cytotoxic and anti-inflammatory actions so it is used in treatment of HIV infection.

3.2.3. Gossypol ^[32].

Biological Source: It is a pigment found in the oil of seeds of cotton *Gossypium herbaceum*.

Family: Malvaceae.



Fig 8: Gossypium plant

MOA: Human immunodeficiency virus replicate in host cell. The Gossypol inhibit replication cycle of HIV.

Uses: Gossypol is a male contraceptive agent due to its antispermatic activity. It also shows insecticidal

properties. It has been investigated for spermicidal, antiviral, antiprotozoal and antitumor activities.

3.2.4. Calanolide ^[29]

Biological Source: It consists of dried leaves and twing of the tropical trees of *Callophyllum lanigerum*.

Family: Clusiaceae.

Chemical Constituents: The chief active constituents of calanolide are calanolide A & B. It also contains dihydroderivative of calanolide A & B.

MOA: It inhibited the cytopathic effects of HIV-1 in T- cell lines, including both CEM-SS cells and MT-2 cells. Calanolides A inhibited the AZT- resistant variant G9106 at an EC50. All three calanolides inhibited the laboratory adapted HIV 1 variants.

Uses: It is used in the treatment of HIV infection.

3.2.5. Castanospermine ^[20]

Biological Source: It consist of dried seeds of *Castanospermum australe*.

Family: Papilionaceae.

MOA: Castanospermine induce hyperglycosylation of the transmembrane glycoproteins 120/160 and 41. It also inhibits HIV replication and syncytium formation induced by the glycoprotein of HIV.

Uses: It is used in treatment of HIV infection. It is also used as anticancer.

4. Liver Disorder ^[4]

Liver is the most important organ of metabolism and

4.1 Herbal Remedies for liver disorder ^[4]

excretion. About 20, 000 deaths occur every year due to liver diseases. The liver diseases include liver cirrhosis (cell destruction and increase in fibrous tissue), acute chronic hepatitis (inflammatory disease) and hepatitis (non-inflammatory condition). Jaundice, a yellow discoloration of the skin and eyes caused by bile in the blood, is a symptom of blockage of the bile duct, or disease within the tissue of the liver itself. Causative factors of liver disorders include virus infection; exposure to, or consumption of, certain chemicals, e.g., the excessive inhalation of chlorinated hydrocarbons or over indulgence in alcohol; medication with antibiotics, chemotherapeutic agents and possibly plant materials such as those containing pyrrolizidine alkaloids contaminated food containing toxins such as aflatoxins or peroxides in oxidized edible oils; ingestion of industrial pollutants, and radioactive material ^[23, 25].

There are few effective cures for liver disease. There has developed a considerable interest in the examination of those numerous worldwide traditional plant remedies which are used for such treatment. In such liver damage the serum level of the liver enzymes, particularly serum glutamicoxaloacetic transaminase and serum glutamic pyruvic transaminase, is raised and the extent of its control by the antihepatotoxic drug under test is used as a basis for estimation. Other effects of induced liver damage used in the evaluation of plant extracts are the prolonged lengthening of the time of lost reflex induced by short- acting barbiturates; reduction of prothrombin synthesis giving an extended prothrombin time; reduction in clearance of certain substances such as bromosulphalein ^[24].

Liver protective herbal drugs contain a variety of chemical constituents like phenols, coumarins, ligands, essential oil, monoterpenes, glycosides, flavonoids, organic acids, lipids, alkaloids and xanthines. Maximum number of these drugs posse's flavonoids and volatile oils as the active constituents ^[4].

Table 5: Herbal Remedies for liver disorder

S. No.	Plant	Family	Part of use
A.	Phenol containing drugs-		
1.	Arnica Montana	Compositae	Whole plant
2.	Cichorium intybus	Compositae	Whole plant
3.	Picrorhiza kurroa	Scrophulariaceae	Whole plant
4.	Syzygium aromaticum	Myrtaceae	Root
B.	Coumarin containing drugs-		
1.	Artemesia abronatum	Compositae	Whole plant
2.	Artemesia capillaries	Compositae	Whole plant
3.	Artemesia messerschimidiana	Compositae	Whole plant
C.	Lignans containing drugs-		
1.	Silybum marianum	Composite	Seed
D.	Essential oil containing drugs-		
1.	Anethum graveolens	Umbelliferae	Fruit
2.	Apium graveolens	Umbelliferae	Seed
	Foeniculum vulgare	Umbelliferae	Fruit
	Salvia rhytidea	Labiatae	Whole plant
E.	Monoterpenes containing drugs-		
1.	Dryobalanops aromatica	Dipterocarpaceae	Whole plant
F.	Sesquiterpens containing drugs-		
1.	Atractylodes lanceae	Compositae	Rhizome

2.	<i>Atractylodes macrocephala</i>	Compositae	Rhizome
3.	<i>Lindera strychnifolia</i>	Lauraceae	Root
G.	Diterpenes containing drugs-		
1	<i>Andrographis paniculata</i>	Acanthaceae	Whole plant
H.	Triterpene containing drugs-		
1.	<i>Cucurbita pepo</i>	Cucurbitaceae	Whole plant
2.	<i>Ecballium elaterium</i>	Cucurbitaceae	Whole plant
3.	<i>Glycyrrhiza glabra</i>	Leguminosae	Root
4.	<i>Sambucus chinensis</i>	Caprifoliaceae	Whole plant
5.	<i>Tetrapanax papyriferum</i>	Araliaceae	Leaves
6.	<i>Zygophyllum coccineum</i>	Zygophyllaceae	Whole plant
I.	Carotenoids containing drugs-		
1.	<i>Gardenia florida</i>	Rubiaceae	Fruit
J.	Glycosides containing drugs-		
1.	<i>Carica papaya</i>	Caricaceae	Bark
2.	<i>Dianthus superbus</i>	Caryophyllaceae	Whole plant
3.	<i>Panax ginseng</i>	Araliaceae	Rhizome
4.	<i>Picrorhiza kurroa</i>	Scrophulariaceae	Root
5.	<i>Polygonum cuspidatum</i>	Polygonaceae	Root
6.	<i>Polygonum multiflorum</i>	Polygonaceae	Root
K.	Flavonoids containing drugs-		
1.	<i>Acacia catechu</i>	Leguminosae	Heartwood
2.	<i>Anemone hepatica</i>	Ranunculaceae	Whole plant
3.	<i>Artemisia cappillaris</i>	Compositae	Whole plant
4.	<i>Canscora decussate</i>	Gentianaceae	Whole plant
5.	<i>Convallaria majalis</i>	Liliaceae	Whole plant
6.	<i>Euphorbia palustris</i>	Euphorbiaceae	Aerial part
7.	<i>Euphorbia stepposa</i>	Euphorbiaceae	Whole plant
8.	<i>Mentha piperitta</i>	Labiatae	Leaves
9.	<i>Ononis arvensis</i>	Papilionaceae	Whole plants
10.	<i>Reseda luteola</i>	Resedaceae	Flowers
11.	<i>Scrophularia grossheimi</i>	Scrophulariaceae	Whole plant
12.	<i>Scutellaria baicabensis</i>	Labiatae	Root
13.	<i>Stachys neglecta</i>	Labiatae	Whole plant
14.	<i>Stachys erecta</i>	Labiatae	Whole plant
15.	<i>Tagetes patula</i>	Tubuliflorae	Inflorescence
16.	<i>Unacaria gambir</i>	Rubiaceae	Heartwood
II.	Organic acids and lipids containing drugs-		
1.	<i>Curcuma longa</i>	Zingiberaceae	Rhizome
2.	<i>Curcuma xanthorrhiza</i>	Zingiberaceae	Rhizome
3.	<i>Linum usitatissimum</i>	Linaceae	Seed oil
4.	<i>Nigella sativa</i>	Ranunculaceae	Seed oil
III.	Alkaloids containing drugs-		
1.	<i>Aristolochia clematis</i>	Aristolochiaceae	Whole plant
2.	<i>Berberis vulgaris</i>	Berberidaceae	Root
3.	<i>Desmodium species</i>	Leguminosae	Whole plant
4.	<i>Fumaria nebula</i>	Papaveraceae	Whole plant

4.2 Description of herbs

4.2.1. Garlic ^[21]

Biological Source: This consist of bulbs of plant known as *Allium sativum*.

Family: Liliaceae.

Macroscopic Character

Colour: Bulbs are white to pink in colour.

Odour: Characteristic and aromatic.

Taste: Aromatic and pungent.

Size: 1.5 to 2.5 cm.



Fig 9: Garlic (bulbs)

Chemical Constituents-
Garlic bulbs contain

- 29% of carbohydrates,
- 56% of proteins (albumin),
- 0.1% of fat, mucilage,
- 0.1% of volatile oil.

Volatile oil of the drug is the chief active constituent, and contains allyl propyl disulphide, diallyl disulphide, allicin and alliin.

MOA: Garlic contains a sulphur based compound called alliin. When the cells are broken, it is converted to allicin and finally diallyl sulphide. Garlic reduces serum lipid levels because it causes-

1. Reduction or inhibition of lipogenesis.
2. Enhancing breakdown and excretion of lipids.
3. It increases HDL and reduces LDL.
4. It reduce platelet aggregation.
5. It exerts strong antioxidant effect, prevents lipid peroxidation and hence protects liver cells from various toxins including mutagenic chemicals.

Uses

1. Garlic is used to reduce serum cholesterol.
2. It is used in treatment of atherosclerosis.
3. It is used in treatment of amoebic dysentery and parasites like tapeworm and hookworm.
4. Garlic shows antibiotic activity against Mycobacterium tuberculosis, staphylococcus aureus and S. faecalis.

4.2.2. Picrorrhiza [29]

Biological Source: It consist of dried rhizomes of the plant Picrorrhiza kurroa.

Family: Scrophulariaceae.

Macroscopic Character

Colour: Rhizomes are deep greyish-brown in colour.

Odour: Slight and unpleasant.

Taste: Bitter.

Size: 3 to 5 cm in length.



Fig 10: Picrorrhiza plant

Chemical Constituents: It contain picroside I, picroside II and kutkoside. These are C9 moterpene glycosides with an epoxy oxide in ring.

MOA: In patients with infective hepatitis and jaundice, there was a rapid fall in serum bilirubin levels towards the normal range and a quicker recovery with no untoward effects. The extracts of P. kurroa exert hepatoprotective activity in rats against carbon tetrachloride-induced toxicity and

hydrocholagogue activity was observed.

Uses: It is used as bitter tonic, antiperiodic, febrifuge and stomachic. It is laxative in large doses. Alcoholic extract of the root have antibacterial effect. The drug is useful in the treatment of jaundice. Kutkaoside is a potential hepatoprotectant.

4.2.3. Artemisia [12]

Biological Source: These are the unexpanded flower- heads of Artemisia capillaris.

Family: Compositae

Macroscopic Character

Colour: Flowers are yellow in colour.

Odour: Aromatic and sweet

Taste: Bitter and camphoraceous

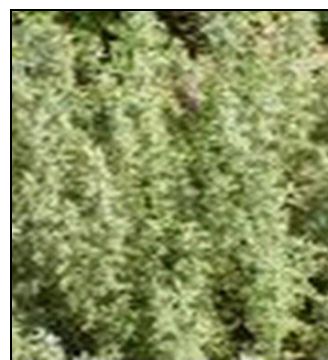


Fig 11: Artemisia plant

Chemical Constituents: The chief active constituents of the drug is santonin. Santonin is a sesquiterpene lactone which is anhydride of santonic acid. If the flower – heads are unexpanded and quickly dried, they yield over 3.0% of santonin.

MOA: It inhibit signaling pathways of hepatocyte apoptosis; the suppression of hepatic stellate cell activation and subsequent liver fibrosis: transcriptional activation of bilirubin metabolism via a specific nuclear receptor; and posttranslational activation of multidrug resistance-associated protein 2 (MRP2), a multispecific organic anion transporter that plays a critical role in bilirubin clearance and bile salt-independent bile formation.

Uses: Santonica is used as a strong anthelmintic, especially for round worms. It is an effective remedy for liver problems, being specifically helpful in treating hepatitis with jaundice. It is used as the tonic for liver, gallbladder and digestive system. The leaves and young shoots are antibacterial, anticholesterolemic, antiviral, cholagogue, diuretic, febrifuge and vasodilator. An infusion is used internally in the treatment of jaundice, hepatitis, gall bladder etc.

4.2.4. Fennel [21]

Biological Source: It consist of dried ripe fruits of the plant Foeniculum vulgare.

Family: Umbelliferae

Macroscopic Characters

Colour: Green to yellowish-brown

Odour: Sweet aromatic
Taste: Strongly aromatic
Size: 5 to 10 mm



Fig 12: Fennel fruits

Chemical Constituents: Fennel consists of 3 to 7% of volatile oil, about 20% each of proteins and fixed oil. The chief active constituent of the volatile oil is a ketone, fenchone 20% and a phenolic ether anethole 50%. The other constituents are phellandrene, limonene, methyl chavicol, anisic aldehyde, etc.

MOA: The methanolic extract of fennel showed a characteristic of mechanism-based inactivation on erythromycin N-demethylation mediated by human liver microsomal cytochrome P450 3A4 (CYP3A4). Thirteen compounds have been isolated from a methanol extract of fennel and tested for their inhibition on CYP3A4. Among them, 5-methoxypsoralen (5-MOP) showed the strongest inhibition.

Uses: It break the kidney stones, prevent nausea, aid digestion, prevent gout, purify the liver, reverse alcohol damage to the liver, and treat jaundice. It may be effective when used along with conventional treatments in prostate cancer. Fennel is a cleansing and medicating herb, and can be used for a steam facial for opening pores and rejuvenating facial skin.

4.2.5. Glycyrrhiza^[4]

Biological Source: It consists of dried, peeled or unpeeled, root and stolon of *Glycyrrhiza glabra*.

Family: Leguminosae

Macroscopic Characters

Colour: Pale yellow

Odour: Faint and characteristic

Taste: Sweet

Size: 20 to 50 cm



Fig 1: Glycyrrhiza roots

Chemical Constituents: The chief constituents of licorice is a triterpenoid saponin known as glycyrrhizic acid. Other

constituents of licorice are glucose 4%, sucrose 6.5%, asparagin 4%, resin and fat.

MOA: Among a wide spectrum of biological activities, glycyrrhizin is effective in treating chronic viral hepatitis. Glycyrrhetic acid impairs the growth of herpes simplex type 1, vaccinia, Newcastle disease and vesicular stomatitis viruses. Other antiviral related biological effects of glycyrrhizin include the activation of natural killer cells and the induction of interferons^[1,2].

Uses: Licorice root is used to prevent and treat stomach ulcers. It is used in the treatment of heart disease. It is used as an antispasmodic. It is used in the treatment of human immunodeficiency virus (HIV). It is used in the treatment of inflammations, rheumatoid arthritis and Addison's disease.^[13] Licorice (*Glycyrrhiza glabra*) is also a powerful herb that has been proclaimed to help the liver. It is important to avoid licorice during pregnancy. It is used in the treatment of chronic viral hepatitis. When used intravenously, licorice has been demonstrated to lower liver enzymes Licorice may contain iron and should therefore be avoided by people with iron overload diseases, such as hemochromatosis and sometimes chronic hepatitis C^[5,26].

5. Conclusion

My project Herbal Remedies for – Viral Infection, HIV and Liver disorder, in this project I tried to explore the vast herbal remedies for the above mention disease. I found that this disease can be treated by use of various herbs given in table no. 2.2 for viral infection, table no. 3.1 for HIV and table no. 4.1 for Liver disorder.

Now day's the most Challenging Research need field in pharmaceuticals is the viral infection, HIV and common Liver disorder. But unfortunately the chemicals are not much effective against viral infection, HIV and common Liver disorder and as well as having lot of side effects.

So that I choose my project work in above same topic, because herbal medicines has minimum side effect and broad spectrum of treatment capacity and need a lot of resesarch and request your attention in same with, my best efforts the project work consist all major herbs and their MOA with possible details.

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