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REVIEW ARTICLE

ANTI VIRAL MEDICINAL PLANTS – AN ETHNOBOTANICAL APPROACH

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SUMMARY

Globally the usage of medicinal plants is increasing tremendously. By keeping this, we have made an attempt to list out the Indian medicinal plants which are highly useful in the treatment of viral infections and associated conditions. This may be helpful for the researchers who are working in the area of drug discovery from the herbal resources. Viral infections can be one of the biggest nightmares for medical doctors. And the use of antiviral herbs holds some distinct advantages over the use of drugs.

Keywords: Medicinal plants, Antiviral.

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1. Introduction

Nowadays there is an increasing demand for the medicinal plants and herbal products in the market. The price and side effects from the modern medicine forces the poor to afford the medicinal plants in a reasonable cost and access to it. The only problem encountered here is the lack of standardization, insufficient quality control, overall under-reporting, etc. The challenges posed in evaluating and improving the safety of herbal drugs are the need for standardization and quality control, official compendia, dissemination of information, additional research, pharmaco-vigilance and regulations. Now the recent issue is the Swine flu among the countries, looking for the remedy from the medicinal plant sector. So few of the medicinal plants having the antiviral; actions need to be tested from its potency and efficacy against this. Here we narrated some of the medicinal plants highly recommended for the viral infections and its associated symptoms. Unlike pharmaceutical drugs, antiviral herbs are full spectrum, and viruses do not develop resistance to them.

2. Viral Infections

Viruses can affect any part of the body or body system. The most common type of viral infections involve the respiratory tract. For example, the cold virus involves the upper respiratory tract, viral throat infections, and laryngitis. Lower respiratory tract infections may include viral pneumonia.

The gastrointestinal system is also commonly affected by viruses with symptoms such as diarrhoea and/or vomiting. The liver can also be infected by viruses such as the hepatitis virus family.

The skin can also be infected by a viral

infection such as the common wart or chicken pox. Nervous system viral infections include encephalitis and rabies.

Systemic viral infections can also occur with certain viruses or when replication of the virus in the body accelerates unchecked, and the virus affects multiple body systems. This can be an extremely dangerous condition and usually requires prompt medical attention. HIV is an example of a systemic viral infection.

Most viruses that infect humans, such as those that cause routine respiratory infections (e.g., cold viruses, influenza viruses) and gastrointestinal infections (e.g., Rotaviruses, Norwalk virus), cause acute infections. Acute infections are of relatively short duration with rapid recovery.

In persistent infections, the viruses are continually present in the body. Some persistent infections are late complications following an acute infection and include subacute sclerosing panencephalitis (SSPE) that can follow an acute measles infection and progressive encephalitis that can follow rubella. Other persistent infections are known as latent viral infection. In a latent viral infection the virus remains in equilibrium with the host for long periods of time before symptoms again appear, but the actual viruses cannot be detected until reactivation of the disease occurs. Examples include infections caused by HSV-1 (fever blisters), HSV-2 (genital herpes), and VZV (chickenpox-shingles). In the case of chronic virus infections, the virus can be demonstrated in the body at all times and the disease may be present or absent for an extended period of time. Examples include hepatitis B (caused by HBV) and hepatitis C (caused by HCV). Slow infections are ones in which the infectious agents gradually increase in number over a very long period of time during which no significant symptoms are seen. Examples include AIDS (caused by HIV-1 and HIV-2) and certain lentiviruses that cause tumors in animals. Although not viruses, prions also cause slow infections.

3. Types of viruses

Adenoviruses, Herpes Simplex, Varicella-Zoster Virus, Cytomegalovirus, Hepatitis B, Enteroviruses, Rhinoviruses, Rubella, Hepatitis C, Measles, Influenza, HIV Infection and AIDS.

4. Swine flu

Swine flu (swine influenza A) is a respiratory disease caused by influenza viruses that usually infect the respiratory tract of pigs. Swine flu viruses have the capacity to mutate so that they are easily transmissible among humans. The 2009 outbreak is due to infection with the H1N1 virus and was first observed in Mexico. Symptoms in humans are similar to most influenza infections: fever, cough, nasal secretions, fatigue, headache, and gastrointestinal symptoms like vomiting and diarrhea. Two antiviral agents, Zanamivir and Oseltamivir are known to be effective in this condition, if taken within 48 hours of the onset of symptoms. This infection has appeared to pose a threat to young children and adults, and those with an immuno compromised status.

Herbal medicines with antiviral activity can be used to prevent or reduce the effects of the viral infection. These medicines include *Andrographis paniculata* (3), *Allium sativum* (24), *Curcuma longa* (10,25) *Sambucus nigra* (2) *Glycyrrhiza glabra* (17), *Ocimum species* (5,25,26,27), *Phyllanthus niruri* (15), *Picrorhiza kurroa* (18), *Echinacea purpurea* (1,19), *Zingiber officinale* (28), *Fructus schisandrae (23), Plumbago zeylanica* (20) and *Emblica officinalis* (21). In the case of swine flu, the earlier these medicines are started, the better the therapeutic effect.It is also important to boost the immune status of the body in order to bring about a faster recovery and prevent complications. This can be done by using medicines like *Aloe ferox, Withania somnifera* (22), *Swertia chirata* (4), *Ocimum sanctum* (5), *Ocimum basilicum* (27), *Ocimum gratissimum* (26) can also be used for

this purpose. So effective utilization of these medicine as a formula will provide a cure.

5. Antiviral drugs from medicinal plants

The plants mentioned below are highly recommended for the management of viral infections as per the literature. And the plants which are used commonly for viral infection are listed in the Table No. 1

Individual species of *Hypericum,Lygodium,* and *Maesa* (6), *Pterocaulon sphacelatum*, *Dianella longifolia*, *Euphorbia australis, Scaebola spinescens, Pittosporum phylliraeoides, microcarpa Lonicera japonica*, *Isatis indigotica, Strobilanthes cusia O. Kuntze, Astragalus membranaceus*, *Hedysarum polybotrys*, *Andrographis paniculata, Glycyrrhiza uralensis*, *Ligusticum wallichii* **(7),** *Solanum tuberosum, Magnolia grandiflora, Baccharis trinervis, Baccharis teindalensis, Eupatorium articulatum, Eupatorium glutinosum, Tagetes pusilla, Neurolaena lobata, Conyza floribunda, Phytolacca bogotensis, Phytolacca rivinoides*, *Heisteria acuminata Nepeta nepetella, Nepeta coerulea, Nepeta tuberose, Dittrichia viscose, Sanguisorba minor, Emblica officinalis, Plumbago zeylanica, Withania somnifera, Areca catechu, phyllanthus urinarin, polygonum cuspidatum, Eclipta alba* (8), *Agrimonia pilosa*, *Archidendron clypearia, Pithecellobium clypearia ,Punica granatum, Scutellaria discolor, Blumea laciniata*, *Elephantopus scaber*, *Laggera pterodonta*, *Mussaenda pubescens*, *Schefflera octophylla*, *Scutellaria indica* (9), *Aegle marmelos*, *Aristolochia indica*, *Azadirachta indica*, *Cassia fistula*, *Catharanthus roseus*, *Curcuma longa*, *Cynodon dactylon*, *Lantana camara*, *Melia azedarach*, *Mimosa pudica*, *Momordica charantia*, *Morus alba*, *Ocimum americanum*, *Phyllanthus amarus*, *Phyllanthus emblica*, *Psidium guajava*, *Solanum nigrum*, *Tridax procumban* and *Tylophora indica* (10), *Minthostachys verticillata* (11), *Pinus massoniana Lamb., Plantago major Linn., Uranaia crinite* (12), *Houttuynia cordata* (13), *Boswellia ameero, Boswellia elongata*, *Buxus hildebrandtii*, *Cissus hamaderohensis*, *Cleome socotrana*, *Dracaena cinnabari*, *Exacum affine*, *Jatropha unicostata*, *Kalanchoe farinacea* (14), *Capparis spinosa, Cichorium intybus, Solanum nigrum, Cassia occidentalis, Terminalia arjuna, Achillea millefolium, Tamarix gallica, Eclipta alba, Phyllanthus niruri, Berberis aristata, Raphanus sativus, Phyllanthus emblica, Plumbaga zeylanica, Boerhaavia diffusa, Tinospora cordifolia, Embelia ribes, Terminalia chebula and Fumaria officianlis* (16).

Table: 1 Aanti viral (H1N1) medicinal plants

S. No	Botanical name	Antiviral activity against	Part used
01	*Andrographis paniculata*	H1N1,H9N2,H5N1.	Whole plant
02	*Allium sativum*	Herpes simplex virus type 1, Herpes simplex virus type 2, Parainfluenza virus type 3, Vaccinia virus, Vesicular stomatitis virus, and Human rhinovirus type 2.	Bulbs
03	*Curcuma longa*	H1N1,H6N1	Rhizomes
04	*Echinacea purpurea*	H3N2,H1N1	Roots,aerial part
05	*Picrorhiza kurroa*	Hepatitis B virus	Roots,rhizomes
06	*Sambucus nigra*	H3N2,H1N1	Fruits
07	*Swertia chirata*	Herpes simplex virus	Root, stem
08	*Ocimum sanctum*	Polio virus type 3,Vaccinia (VACV), New castle disease viruses(NDV).	Leaves
09	*Ocimum basilicum*	Herpes simplex virus, denovirus, Hepatitis B virus.	Leaves
10	*Ocimum gratissimum*	HIV-1 proviral DNA	Leaves
11	*Zingiber officinale*	HIV	Rhizomes
12	*Emblica officinalis*	Influenza	Fruits,seeds
13	*Plumbago zeylanica*	Coxsackievirus B3(CVB3)	Bark,roots
14	*Withania somnifera*	Human simplex virus 2	Roots
15	*Solanum nigrum*	Human simplex virus 1and 2	Whole plant

6. Phytochemicals in the management of viral infections

Attempts have been made to isolate herbal agents that are thought to possess antiviral activity. Herbal preparations that strengthen the immune system may help the body fight off invading viruses that could otherwise cause infection, and are of particular interest to the scientific community**.** Current research shows promise for arabinoxylan, a compound derived from Hyphomycetes mycelia mushroom, as an antiviral agent. Other herbals and immune supporters that may offer protection against viruses include but are not limited to: astragalus, Siberian ginseng, garlic, coenzyme Q10, DMG (dimethlyglycine), andrographis, cat's claw, cloves, elderberry, ginger, lemon balm, licorice, olive leaf, oregano, shiitake and reishi mushrooms, St. John's wort, resveratrol, scullcap, N-acetyl-cysteine, green tea, propolis, cranberry, and mullein.

The following all phyto constituents are having antiviral activity.

Catechins, flavones, curcumin, isoflavones, resveratrol, proanthocyanidins, flavonoids, saponins, terpenes, quercetin, morin, rutin, dihydroquercetin (taxifolin), apigenin, catechin, hesperidine, galangin, kaempferol, allicin, picrosides, picrorhizin, mangiferin, amarogentin, andrographolides, sapogenins like betulinic acid, oleanolic acid, glycyrrhetic acid, poly methoxylated flavonols, 5-hydroxyl-3-methoxy flavones, polysaccharides, berberine, polyaceytlenes, alkamides (especially the isobutyl amides), caffeic acid, chicoric acid and echinacin, properdin, orientin, vitexin, proglobe flowery acid, imperatorin, gymnemic acid, hydroxyl dammarenone, hydroxy hopanone, hydroxy oleanolic -lactone, lanatoside-A, lanatoside-B, glycosyl-7-oluteolin, lignin, chelerythrine, pseudo hypericin, trypanoside, hainandolide, bornyl acetate, methoxy isoflavone.

6. Discussion

Potential effective antiviral herbal preparations may stimulate the immune system and assist the body in fighting off infection before the virus has had a chance to invade living cells. The drugs mentioned aid in disrupting the life cycle of the virus and inhibit further replication and infection of healthy cells.

Herbs that are thought to promote detoxification and elimination are often used in conjunction with antiviral herbs to further enhance action of the immune system.

And the plant drugs which are having activity on virus, that is affecting respiratory system must possess effective role on H1N1 infection. Also the common potent antiviral drugs with high immuno modulating property are recommended for the swine flu.

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