AMERICAN JOURNAL OF PHARMTECH RESEARCH

Journal home page: http://www.ajptr.com/

A Potential of Some Indian Medicinal Herbs As Antiviral Agents

Kalyani Pathak[1]*, Krishna Baishya[1]

1.Department of Pharmaceutical sciences, Dibrugarh University

ABSTRACT

Viral diseases, including emerging and chronic viruses, are an increasing worldwide health concern. As a consequence, the discovery of new antiviral agents from plants has assumed more urgency than in the past. A number of native Indian medicines of plant origin are known to have antimicrobial and anti-inflammatory activity, although only a few have been studied for their antiviral properties and immunomodulating effects. The number of patients seeking alternate and herbal therapy is growing exponentially. Herbal medicines are the synthesis of therapeutic experiences of generations of practicing physicians of indigenous systems of medicine for over hundreds of years. Herbal medicines are now in great demand in the developing world for primary health care not because they are inexpensive but also for better cultural acceptability, better compatibility with the human body and minimal side effects. This review gives an overview of some important medicinal plants with antiviral activities which are traditionally used in India.

Keywords- antiviral, Herbal medicine, immunomodulating effects

*Corresponding Author Email: kalyakster@gmail.com

Received 24 July 2013, Accepted 05 August 2013

Please cite this article in press as: Pathak K. *et al.*, A Potential of Some Indian Medicinal Herbs As Antiviral Agents. American Journal of PharmTech Research 2013.

INTRODUCTION

Plants have been a major source of medicine for human kind. According to available information, a total of at least 35000 plants species are widely used for medicinal purposes. The demand for traditional herbs is increasing very rapidly, mainly because of the harmful effects of synthetic chemical drugs. Indigenous medicine is now recognized worldwide both by the rural populace and the urban elite as an important healthcare resource. The World Health Organization (WHO) has pointed out that traditional medicine is an important contribution to its health goals. There are considerable economic benefits in the development of indigenous medicine and in the use of medicinal plants for the treatment of various diseases (WHO, 2003). India has a rich tradition of herbal medicine as evident from Ayurveda, which could not have flourished for two thousand years without any scientific basis. Based on clinical effects 50 categories of drug have been decribed – such as appetizers, digestive stimulant, laxatives, anti-diarrhea, anti-haemorrhoid, anti-emetic, anti-pyretic,anti-viral anti-inflammatory, anti-pruritic, anti-asthmatic, antiepileptic, anti-helminthic, haemoptietic, haemostatic, analgesis, sedative, promoter of life (Rasyana), promoter of strength, complexion, voice, semen and sperm, breast milk secretion, fracture and wound healing, destroyer of kidney stones etc [1].

Viral diseases, including emerging and chronic viruses, are an increasing worldwide health concern. Due to the global disease burden caused by viral infections there is an urgent need for novel and more effective antiviral drugs. Medicinal herbs and their bioactive constituents came in the center of interest, since they may provide feasible treatment options for the population of developing countries, where the majority of the population cannot afford for expensive chemical drugs of western medicine. Now a day, viral infection is becoming a great danger to humans and often causes death. In the past, deadly viruses caused pandemics in the world. Due to the metabolic properties of viruses, they are difficult to control and there are still relatively few drugs for treatment of viral diseases. The major problem encountered in the treatment against viruses is their rapid adaptation and development of drug-resistance as well as the emergence of new hybrid viruses [2].

Common medications used against viral infections are often inadequate and show a variety of side effects. In the last few years, natural remedies gain more and more popularity in the field of medical science [3]. The idea of herbal drugs is popular because of easy access, cost effectiveness, less side effects and good tolerability.

Viruses are obligate intracellular parasites with a viral genome (DNA or RNA) and protein envelope (capsid). Viruses do not have an own metabolism and are not able to replicate by own or to perform biosyntheses. To this end, they exploit and control the host cell. They are transmitted by droplet infection, exchange of body fluids, contact infection and blood-sucking insects [4]. The viral life cycle can be divided in various sections -

- During adsorption, the virus attaches to the host cell.
- The virus penetrates the cell and releases genetic material during uncoating.
- The genome of the virus exploits the cell and takes control over it.
- The cell begins to synthesize virus particles.
- Then, new viruses are formed, and finally leave the cell.
- The new viruses are now able to infect other cells.

Mechanisms of action of existing antiviral drugs [5] -

- To prevent viral entry into the cell, adsorption of the virus has to be avoided, *e.g.* by antibodies or specific ligands.
- Inhibit viral uncoating after endocytosis by Capsid-stabilizing agents and blocking of endosomal ion channels.
- DNA or RNA replication can be suppressed by inhibition of DNA- or RNA-polymerases, by endonucleases, or by nucleoside analogues.
- Virus replication can be interfere with Nucleoside analogs
- Protease inhibitors prevent virus maturation and discharge. These substances are peptides that block protease substrates. This leads to suppression of maturation and interruption of the viral replication cycle.

Antiviral activity of Indian plants

Plants contain a wide variety of phytochemicals, such as alkaloids,phenolic compounds, tannins, saponins, flavonoids, terpenoids, lignans, cou-marins, and many other active components [6, 7]. The mechanisms of action of the substances are multi-facetted and often not yet extensively explored. The focus of the present review is particularly on Indian medicinal herbs and plants used to treat viral diseases, which are cheap and easily accessible since viral infections can be one of the biggest nightmares for Medical Practitioners and patients.

CONCLUSION

Nature developed a variety of antiviral agents during the evolution of plants. Due to the global disease burden caused by viral infections now a day and in the past, there is an urgent need to

List of Some Selected Medicinal Herbs under screening for Anti-viral properties based on Traditional Knowledge Documentation [8, 9, 10, 11]

S/N	English name	Local name	Botanical name	Family	Parts use	Medicinal use(s)
1	Onion	Leshan	*Allium sativa*	Liliaceae	Bulb	Measles, Poliomyelitis, Herpes
2	Aloe vera	Kumari,Ghirita	*Aloe barbadensis*	Liliaceae	flowers	Influenza
3	Devil tree	Vishagni	*Alstonia venenata*	Apocyanaceae	Roots	Measles
4	Joseph's coat	Bhaji	*Amaranthus tricolor*	Amaranthaceace	Leaves	Human tumors caused by viruses
5	Custard apple	Sarifa	*Annona reticulata*	Annonaceae	Leaves	Influenza, Measeles
6	Andamanesee bowstring plant	*Indian* - Mallow	*Anodendron paniculatum*	Apocyanaceae	Leaves	Hepatitis
7	Margosa	Neem	*Azadirachta indica*	Meliaceae	Seed, Leaves	Measles, chicken pox, Herpes
8	Indian pennywort	Brahmi	*Bacopa monnieri*	Scrophulariaceae	Seed, Leaves	Herpes, HIV
9	Butterfly tree	Kaniar	*Bauhinia purpurea*	Caeselpiniacece	Leaf, Aerial part	Herpes
10	*Asiatic* penn-ywort, gotukola	Jal Brahmi	*Centella asiatica*	Apiaceae	Root	Herpes, Influenza
11	Nettle-leaved goosefoot	Bathua	*Chenopodium murale*	Chenopodiaceae	Whole plant	Herpes, Hepatitis
12	Henna plant	Mehendi	*Lawsonia inermis*	Lythraceae	Leaves	Poliomylitis, Measles
13	Ginger	Adrak	*Zingiber officinalis*	Zingiberaceae	Rhizome	Poliomylitis, Measles
14	Mango	Aam	*Magnifera indica*	Anacardaceae	Stem bark	Jaundice
15	Bamboo	Bash	*Banbusa vulgaris*	Poaceae	Leaves	Measles
16	Bitter gourd	Kerela	*Momordica charantia*	Curbitaceae	Whole plant	Jaundice, Yellow fever
17	Maize	Makai	*Zea mays*	Poaceae	Flower	Chickenpox
18	Tobacco	Tambaku	*Nicotiana tabacum*	Solanaceae	Leaves	Poliomylitis
19	Heliotrope	Siriyari	*Helitropium indiucm*	Boraginuceae	Leaves	Measles
20	Guava	Amrud	*Psidium guajava*	Myrtaceae	Stem bark	Jaundice
21	Korina, frake	Limba	*Terminalia superb*	Cobretaceae	Stem bark	Yellow fever
22	Purple fruited pea Eggplant, Thai nightshade	Tuduvalai	*Solanum trilobatum*	Solanaceae	leaves	constipation, cough, acute & chronic bronchitis

23	grape-leaved mallow, tropical fanleaf	Karupatti	*Hibiscus vitifolius*	Malvaceae	Root bark	In jaundice, inflammation, diabetes, urease activity
24	Onion	Piyaz	*Allium cepa*	Lilliaceae	Bulb	Malaria, asthma, fever, chronic bronchitis
25	St. John's wort	Hypericum	*Hypericum mysorense*	Hypericaceae	Aerial parts	anxiety, Measles, inflammation, Herpes
26	St. John's wort	Hypericum	*Hypericum hookerianum*	Hypericaceae	Aerial parts	anxiety, Herpes, inflammation
27	Indian Barberry	Oosikala	*Berberis tinctoria*	Berberidaceae	Root	stomachache, ulcer, haemor, Jaundice
28	Nilgiris Shola tree	Mulkadambu	*Mahonia leschenaultii*	Berberidaceae	Root	postnatal conditions, jaundice, fever
29	hogweed, horse purslane, pigweed	Santi ghass	*Boerhavia diffusa*	Nyctaginaceae	Root	jaundice
30	Southern Cone Marigold, Stinking Roger, black mint	Stinking rogar	*Tagetes minuta*	Asteraceae	Whole plant	diuretic, anti inflammatory, stomachic
31	Leucas	Halkusha	*Leucas lavandulaefolia*	Labiatae	Aerial parts	sedativeness, nervous disorders, as vermifuge
32	Mexican poppy	Pili Katili	*Argemone mexicana*	Papaveraceae	Latex	Jaundice
33	false daisy	bhringraj	*Eclipta prostrata*	Asteraceae	Leaves	Jaundice, Hepatitis
34	Ramontchi, governor's plum	Bhilangra	*Flacourtia indica*	Flacourtiaceae	Leaves	Jaundice
35	Orrangeberry	Pillu	*Glycosmis pentaphylla*	Rutaceae	Leaves	Jaundice, Hepatitis
36	Yellow Teak	kadam	*Haldina cordifolia*	Rubiaceae	Bark	Jaundice, asthma
37	Kurchi	Indrajao	*Holarrhena pubescens*	Apocynaceae	Seeds	Jaundice, Herpes
38	midnight horror, Indian trumpet flower	Arula	*Oroxylum indicum*	Bignoniaceae	Bark	Jaundice
39	five-leaved chaste tree	Sambhalu	*Vitex negundo*	Verbenaceae	Leaves	Jaundice, Anti-inflammatory
40	Fire Flame Bush, Red Bell Bush	Dhaudi	*Woodfordia fruticosa*	Lythraceae	Fruits	Jaundice
41	King of bitters	Kalmegh	*Andrographis*	Acanthaceae	Whole plant	Jaundice, Herpes

			paniculata			
42	Pigeon pea	Rahar	*Cajanus cajan*	Fabaceae	Leaves	Jaundice, Measles
43	Indian gooseberry	Amla	*Phyllanthus emblica*	Euphorbiaceae	Fruit	Jaundice, Herpes, HIV
44	Sweet Basil	Tulsi	*Ocimum americanum*	Lamiaceae	Whole plant	Jaundice, Herpes, Hepatitis
45	Bermuda grass	Doob	*Cynodon dactylon*	Poaceae	Leaves	Jaundice, Antidiarrheal
46	Indian Tinospora	Guduchi	*Tinospora cordifolia*	Menispermaceae	stem	Jaundice
47	Stonebreaker	Jarmala	*Phyllanthus amarus*	Euphorbiaceae	Whole plant	Jaundice, Hepatitis

identify novel compounds with antiviral activity. Medicinal herbs might contribute to an improvement of public health especially in developing countries, since the majority of the population has not the economic power to account for expensive antiviral drugs. A condition to realize the concept of evidence-based phytotherapy is to explore the scientific basis of bioactive medicinal plants. Placebo-controlled, double-blind clinical trials have to be performed to provide unambiguous evidence for the therapeutic value of medicinal plants. In addition to efficacy, the safety of phyto therapeutic approaches has to be demonstrated.

REFERENCE

1. Alschuler L, Benjamin SA, Duke JA . Herbal medicine - what works, what is safe. Patient Care 1997; 31:48-103.
2. Salzberger B. Der Internist 2006. 47(12), 1245-1250.
3. Efferth T. Chinese Journal of Nature Medicine 2011. 9(1), 1-6.
4. Lin C.W., Wu C.F., Hsiao N.W., Chang C.Y., Li S.W., Wan L., Lin Y.J. and Lin W.Y. Int J Antimicrobial Agents 2008. 32(4), 355-359.
5. Semple S.J., Pyke S.M., Reynolds G.D. and Flower R.L. Antiviral Res 2001. 49(3), 169-178.
6. Jassim S.A.A, Naji M.A. J Applied Micro-biology 2003;.95(3):412-427.
7. Ojo O.O., Oluyege J.O, Famurewa O. African J Plant Sci 2009*;* 3(7): 157-159.
8. Pal SK. Complementary and alternative medicine: An overview. Current Science 2002.82, 518-24.
9. Indian Materia Medica Vol: 1 by, Dr. K.M. Nadkarani, Publisher: Popular Prakash, Mumbai; 3rd edn.; 1976.
10. Chopra, R. N.; Nayar, S. L. and Chopra, I.C. In Glossary of Indian medicinal plants, Council of Scientific and Industrial Research, New Delhi; 1956.
11. Mukherjee, P.K.; GMP for Indian Systems of Medicine; Business Horizons, New Delhi; 99-112; 2003.
12. P. Vijayan, C. Raghu, G. Ashok, S.A. Dhanaraj, B. Suresh. Antiviral activity of medicinal plants of Nilgiris; Indian J Med Res 2004;120:24-29
13. Sharma J, Gairola S, Gaur R.D, Painuli RM. The treatment of jaundice with medicinal plants in indigenous communities of the Sub-Himalayan region of Uttarakhand. India; J Ethnopharmacology 2012.143, 262–291