

# Most promising Antiviral Herbs of Indian subcontinent :Ginger(*Zingiber officinale*), Basil(*Ocimum sanctum*) and Neem(*Azadirachta indica*)

There is a proverb in my locality that God do not give any disease without it's remedy .I also believe that we have to find out the remedies from nature. From my childhood I am familiar with some herbal ingredients used in my family. My mother always prefers herbal products for medication for mild to moderate symptoms of viral disease. In my childhood when I was affected by mumps , she had given me ginger paste and salt with luke worm water to gargle daily for several times .Taking this herbal preperation I did feel better and recovered within a short time . She suggests us to use ginger and basal tea for sore throat , coughing ,cold and flu. In my country Bangladesh , recently there is a outbreak of lumpy skin disease (LSD) epidemic .Owners of cattle use neem extract mixing with soda ,molasses and salt to the cattle for 7 days with also autohemotherapy which gives a tremendous result .These experiences help me to realize how important the herbs are to treat viral disease.

The history of using herbs as antiviral is old but first recognized interest in their development as antiviral agent is the efforts of the Boots drug company (Nottingham,England).Later studies have reported the inhibitory effects of medicinal plants extracts on the replication on several viruses. Viral infections have challenged mankind survival and a variety of herbs have shown promise to treat a number of viral infections. In my geographic region there are many herbs but scientific research are very few . I would like to mention three most promising native antiviral herbs sustainable in my surrounding countries namely Ginger, Tulsi and Neem .I believe these herbs are highly efficacious resources for development of antiviral treatment.

Ginger(*Zingiber officinale*) : Ginger is a common spice in Bangladesh .It's aromatic rhizomes are used as medicine and spice in ancient Chine and India .Ginger is under the family of Zingiberaceae is native to humid, partly-shaded regions in moist tropical and subtropical forests of Southeast Asia. It is an important commercial agricultural crop in Indian subcontinent. It is marketed in different form such as raw ,dry, powder, oil, candy, lozenges, tea, flakes etc. Ginger has a very long history of use in various form of traditional and alternative medicine. Ginger have impressive antiviral activity. Fresh ginger is effective against HRSV-induced plaque

formation on airway epithelium by blocking viral attachment and internalization. Ginger is an ingredient of Ge-Gen-Tang (Kakkon-to; GGT) which has been proved to have antiviral activity against human respiratory syncytial virus (HRSV). Test-tube research demonstrates that ginger extract has antiviral effects against avian influenza, respiratory syncytial virus (RSV) and feline calicivirus (FCV). Specific compounds in ginger, such as gingerols and zingerone, have been found to inhibit viral replication and prevent viruses from entering host cells.

Ginger has many health properties that provide a multifaceted natural approach to treating sore throats including cough and cold. It may help relieve and fight viral infection boosting immunity to get rid of sore throat causes.

Ginger can be used in many ways such as raw root, juice, tea ,chew, lozenges etc.it can also be used along with honey or turmeric or lemongrass as tea . Uses of ginger is safer when taken appropriately. Ginger can cause mild side effects including heartburn, diarrhea, burping, and general stomach discomfort.

In Western alternative medicine practice, the primary uses of ginger include prevention of motion sickness, prevention of nausea, treatment of mild stomach upset, reduce pain of osteoarthritis and treatment of rheumatologic conditions as an anti-inflammatory. In vitro research suggests that ginger may have anticancer effects. Combination of ginger and basil has potentiality against respiratory virus like SARS,Covid-19 etc.

#### Basil( *Ocimum sanctum*):

Similar name *Ocimum tenuiflorum*, is commonly known as holy basil or Tulsi is an aromatic plant in the family Lamiaceae.Tulsi is native to the indian subcontinent and widespread as a cultivated plant throughout the tropical land of south east Asia. It is well known for it's antimicrobial properties in traditional herbal medicine in India . Different parts of this herb have medicinal value including antiviral effects .Tulsi had been used within Ayurvedic medicine more than 3000 years. In the Ayurveda system tulsi is often referred to as an "Elixir of Life" , "The incomparable one", "Mother medicine of herbs" , "Queen of Herbs" etc for its healing powers and has been known to treat many different common health conditions.

Antiviral activity of tulsi has been demonstrated against HSV,HIV,NDV,H9N2 etc. In research it is found that extract from *Ocimum sanctum* can prevent cytopathic effect and growth of New Castle Disease Virus (NCDV) in chicken fibroblast monolayer. In another research Antiviral activity of aqueous, ethanol, methanol and chloroform extract of powdered drugs was evaluated against economically important viruses of veterinary importance, Orthomyxovirus and Paramyxovirus. Results of the study suggest that the *O. sanctum* can be used as antiviral

agent for effective control of viral infections of animal importance. The crude extract and terpenoid isolated from the leaves of *Ocimum sanctum* and polyphenol from *A. arabica* has shown promising antiviral properties against H9N2 virus. It is also the effective remedy for the severe acute Respiratory Syndrome. Juice of its leaves gives relief in cold, fever, bronchitis and cough. *Ocimum sanctum* Linn. possesses significant bronchodilator activity in mild and moderate bronchial asthma and compare its efficacy with the standard bronchodilator drug, Salbutamol .

*O. sanctum* L. contain Eugenol which is found to be responsible for the therapeutic potentials. Research support the use of this plant for human and animal disease therapy and reinforce the importance of the ethno-botanical approach as a potential source of bioactive substances. In alternative medicine, tulsi is typically used for anxiety, stress, and fatigue, and may be used in herbal formulations to help treat asthma, bronchitis, colds, and the flu. Tulsi is available in different form like capsules, tinctures, powders, herbal tea etc.

3) *Neem (Azadirachta indica)* : Neem is an indigenous tree species of Bangladesh and also native to dry forest areas of India ,Pakistan, Sri Lanka ,Malaysia ,Indonesia ,Thailand and Myanmar.

*Azadirachta indica* has complex of various constituents including Nimbin, Nimbidin, Nimbolide, and Limonoids and such types of ingredients play role in diseases management through modulation of various genetic pathways and other activities. The bark ,gum, leaves and flowers all are used in herbal medicine. Extract of neem bark and leaf inhibits herpes simplex virus type 1, different strain of influenza virus and duck plague virus. In vitro research shows that Extract of neem (*Azadirachta indica* A. Juss) leaves inhibit group B Coxsackie Viruses. Research investigated the effects of feeding of powdered dry leaves of *A. indica* (AI) on humoral and cell mediated immune responses, in broilers and results showed that AI (2 g/kg) treatment significantly enhanced the antibody titres against new castle disease virus (NCDV) antigen.

Neem leaf is used for leprosy, eye disorders, bloody nose, intestinal worms, stomach upset, loss of appetite, skin ulcers, diseases of the heart and blood vessels (cardiovascular disease), fever, diabetes, gum disease (gingivitis), and liver problems. The leaf is also used for birth control and to cause abortions. Neem leaves are also used for skin in chicken pox virus infection to get relief from itching of skin.

Products made from neem trees have been used in traditional medicine of India for centuries but there is insufficient clinical evidence to indicate any benefits of using neem for medicinal purposes. All parts of the neem tree- leaves, flowers, seeds, fruits, roots and bark have been used traditionally for the treatment of inflammation, infections, fever, skin diseases and dental disorders. In adults, No specific doses have been established, and short-term use of neem appears to be safe, while long-term use may harm the kidneys or liver. In Small children, neem

oil is toxic and can lead to death. Further research are needed to determine an appropriate dosage for neem.

In this pandemic situation all of us can understand how important the study of antiviral development is .Many emerging and re-emerging viral diseases have been threatening human and animal's life. No specific treatment is available for most of the viral disease . Only few antiviral drugs and vaccines are available. Resistance of antiviral drug is also another threat to public health. Uses of antiviral herbs may decrease antiviral resistance in the body . Herbs can be a highly efficacious resource to develop antiviral drugs that will be cost effective , sustainable and safer from risk of antiviral resistance .As the referred herbs have showed a great probability against viral infections proven by scientific study ,I strongly believe that antiviral drugs can be developed from them or their modified components. More research are needed to develop antiviral treatment from these herbs.

#### References:

- 1)Chang JS, Wang KC, Yeh CF, Shieh DE, Chiang LC. Fresh ginger (*Zingiber officinale*) has anti-viral activity against human respiratory syncytial virus in human respiratory tract cell lines. *J Ethnopharmacol.* 2013 Jan 9;145(1):146-51. doi: 10.1016/j.jep.2012.10.043. Epub 2012 Nov 1. PMID: 23123794
- 2) The report on 'how Does Ginger Help a Sore Throat?' Medically reviewed by [Debra Rose Wilson, Ph.D., MSN, R.N., IBCLC, AHN-BC, CHT](#) — Written by [Adrian White](#) — Updated on April 21, 2020
- 3)Goel, Anjana. (2013). in vitro antiviral potential of *Ocimum sanctum* leaves extract against New Castle Disease Virus of poultry,". *International Journal of Microbiology and Immunology Research.* 2. 51-55.
- 4)Tulsi: The Queen of Medicinal Herbs Riddhi R Patel\* Independent Researcher, CRISIL Global Research & Analytics, Gurgaon, Haryana, India
- 5)Usha P. Studies on antiviral activity of tulsi (*Ocimum sanctum*) crude extracts on selected viruses of veterinary importance. *Int J Ayurveda Pharm Res.* 2018;6(4):17-21.
- 6) Vinaya M, Kudagi BL, Ameerudd KM, Mallikarjun S. Bronchodilator activity of *Ocimum sanctum* Linn. (tulsi) in mild and moderate asthmatic patients in comparison with salbutamol: a single-blind crossover study. *Int J Basic Clin Pharmacol.* 2017;6(3):511-517.

7) Shankar M, Saurabh V, Deepak BV, Narayan NS, Ranjan MB, Mohan PM, et al. Double-blinded randomized controlled trial for immunomodulatory effects of Tulsi (*Ocimum sanctum* Linn.) leaf extract on healthy volunteers. *J Ethnopharmacol.* 2011;136:452-456.

8) *Ocimum tenuiflorum* as an antiviral agent Neha, N.; Muralidharan, N. P.; Somasundaram, J. *International Journal of Pharmaceutical Research* ; 12:197-203, 2020. Article | EMBASE | ID: covidwho-809515

9) Yucharoen R, Anuchapreeda S, Tragoolpua Y. Anti-herpes simplex virus activity of extracts from the culinary herbs *Ocimum sanctum* L., *Ocimum basilicum* L. and *Ocimum americanum* L. *Afri J Biotechnol.* 2011;10:860–6

10) Ghoke, S.S., Sood, R., Kumar, N. *et al.* Evaluation of antiviral activity of *Ocimum sanctum* and *Acacia arabica* leaves extracts against H9N2 virus using embryonated chicken egg model. *BMC Complement Altern Med* **18**, 174 (2018). <https://doi.org/10.1186/s12906-018-2238-1>

11) *In vitro* antiviral activity of neem (*Azadirachta indica* L.) bark extract against herpes simplex virus type-1 infection

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12) Badam, L & Joshi, Swati & Bedekar, Sabah. (1999). 'In vitro' antiviral activity of neem (*Azadirachta indica*. A. Juss) leaf extract against group B Coxsackieviruses. *The Journal of communicable diseases.* 31. 79-90.

13) Subapriya R, Nagini S. Medicinal properties of neem leaves: a review. *Curr Med Chem Anticancer Agents.* 2005 Mar;5(2):149-6. doi: 10.2174/1568011053174828. PMID: 15777222