

Medicinal plants as immunity booster in humans against Novel corona virus infection: A review

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Medicinal plants have been used in India since long for their medicinal and cultural practices and play an important role in human welfare. Herbs and spices were well known for their medicinal properties. India is home to several medicinal plant / spices that are used extensively in traditional medicine. According to the WHO, around 80% of the world's population uses herbal medicines for primary health care, particularly across Europe and South Asia. Research indicates that many of these herbs not only have anti-inflammatory properties, they also help build up the body's natural immunity. And unlike allopathic medicines like antibiotics, which can have serious side effects, most of these herbs and spices are relatively safe. Several curative properties of many plants have been listed in sacred vedas; the oldest known literature. It has been reported that in India a total of 17,500 species of flowering plants have been identified but nearly 1300 species of plants are of aromatic nature and used in traditional medicine system (Uniyal, et al., 2002, Backer, 2005; Singh et al., 2013; Vanila et al., 2008; Felsenstein, et al., 2020; CM Khanna et a., 2020).

In recent time, the use of medicinal plants and their extracts has gained unprecedented impetus, all over the world during COVID – 19 pandemics. The people of our country, in particular the rural and tribal people living in some remote area, primarily depends upon the folk and traditional medicine boosting their body. Indigenous knowledge of these plants used for the different purpose in different areas. A large number of plant families have furnished many classes of product, which may vary with the degree of insecticidal, anti-bacterial, activities (Srivastav and Srivastav, 2007; Bedi et al., 2008). Our country has promoted the use of plant product via AYSUSH / AYARYOGYA SETU or guidelines decided by government of India as well as state government. Due their ideal properties such as i.e., **a.** High pesticidal properties **b.** Easily availability **c.** Easily biodegradable with less hazard of environmental contamination **d.** Low-cost **e.** Grow abundantly in endemic areas and safe for users (Gracia et al., 2008; Kaushik and Singh, 2020; Srivastav and Singh, 2020; AYUSH Advisory, 2020).

It was suggested by Ministry of AYUSH (Ayurvedic, Yoga and Naturopathy, Unani, Siddha and Homeopathy), to drink **Kadha** as a booster of immunity and lowering the tenderness caused during COVID – 19 affects different people in different way (AYUSH Advisory, 2020). Most infected people mild to moderate illness and recover without hospitalization. **Most common symptoms:** Fever Dry cough and Tiredness **Less common symptoms:** Aches and pains, Sore throats loss of taste or smell, A rash on skin, or discolouration of finger and toes, Headache and Diarrhoea **Serious symptoms:** Difficulty breathing or shortness of breath, Chest pain or pressure and Loss of speech or movements. People with mild symptoms who are otherwise healthy should manage their symptoms at home. On average it takes 5-6 days from when someone is infected with the virus for symptoms to show, however it can take up 14 days. In this communication, we discuss eighteen medicinal plants knowledge regarding, their flower and fruit and other plants along with medicinal importance to enrich our body (Immunity strength). These are:

1. *Citrus medica* Linn. RUTACEAE

ENGLISH NAME: Citron **HINDI:** Nimbu **PART USED:** Fruits and Leaves

DESCRIPTION: A small tree, about 10 feet high, branches thick small and spiny with white flower, leaves simple, petiole winged Fruit: Globose, yellow acidic **TASTE:** Sour

CHEMICAL CONSTITUENTS: Fruits Contains Vitamin C, Citric acid, Rind contains: Very aromatic oil – Citron oil **ACTIONS:** Stomachic, Heart tonic, Anti-emetic, Appetizer, Astringent **USED IN:** Throat disease, Heart disease, Antiscorbutic, Cough, Asthma, increases appetizer Roots: Anthelmintic, used in vomiting and urinary cacculii; infusion of leaves in Fever.

2. *Curcuma domestica* Linn. ZINGIBERACEAE

ENGLISH NAME: Turmeric **HINDI:** Haldi **PART USED:** Rhizome

DESCRIPTION: Tall herb about 2-3 feet high with fleshy rhizomes of yellow-orange colour in side, tubers thick, cylindric, leaf large, long petioled; Flowers: in compound spikes, covered by enlarged bracts, yellow **TASTE:** Slightly bitter **CHEMICAL**

CONSTITUENTS: Rhizome Contains: Active curcumin compound Essential oils: Termericoil and terpenoids, Avolatile Oil: it contains curcumin (Terpene) starch, Albuminoids; Curmene is helpful in dissolving the cholesterol **ACTIONS:** Stimulant, cooling Aromatic, Blood purifier, Anti-inflammatory, Stomach stringent, Carminative, Antidote, Antiperiodic, alternative **USED IN:** Cold, Cough, Skin disease, Abdominal worms, Diabetes, Scabies, Leucoderma, Polyuria, Ulcer, Swellings, Anaemia, Indigestion, Jaundice, conjeactivities, Blood purifier, liver tonic.

3. *Acacia chundra* (Roxb) MIMOSACEAE (LEGUMINOSAE)

ENGLISH NAME: Black Catechu, **HINDI:** Khair, Kattha **PART USED:** Pithregion,

Bark, Condensed extract of heart wased **DESCRIPTION:** A medium size spiny tree, spines are modification of stipules, leaves 30-40 pairs pinnal 10-20 pairs; pinnules, flowers on spikes, small cremish white, podthin brown shining **CHEMICAL**

CONSTITUENTS: Inner wood contains catechin and catechutannicacid, Catechutannic acid contain 50% Tannin **ACTIONS:** Anti-inflammatory, wound healing, Astringent, cooling, Digestive, Bloodpurifier **USED IN:** skin deseases, Dental disorder, Dry cough, Anaemia, Leprosy, Bronchitis, Pruritus, Stomatis, Diarrhoea

4. *Achyranthes aspera* Linn. AMARANTHACEAE

ENGLISH NAME: Prickly-chaff flower **HINDI:** Latjeara / Chirchita **PART USED:**

whole plant (Leaves, roots and seeds) **DESCRIPTION:** An annual erect herb with square stem, 1-3 feet high, yellowish pink flowers **TASTE:** Bitter and Acrid

CHEMICAL CONSTITUENTS: Seed contain: Saponin A & B Ecdy steron, Oligosacharide Root contains: Oleonilic acid, Maslinic acid, Unripe fruits Contain: Saponin C & D Plant Contains: Nitrogenous Compounds – Achranthine and Alkaloids **ACTIONS:** Purgative, Diuretic, Antibiotic, Astringent, Stomachic, Digestive expectorant, Antidotal, Anthelmintic, Emetic **USED IN:** Seeds: in hydrophobia, Cough, Abdominal colic, toothache, Scabies, Hypotensive, Rheumatism, Piles, Dysentery

5. *Curcuma amada* Linn. ZINGIBERACEAE

ENGLISH NAME: Mango-ginger **HINDI:** Aama Haldi **PART USED:** Roots and Rhizome **DESCRIPTION:** Tall herb with large root stock, pale yellow inside, smelling like mango, leaves large, oblong lanceolate, flowers pale yellow **TASTE:** Bitter and sweet **CHEMICAL CONSTITUENTS:** Rhizome Contains: Essential oils (Pinene, ocimene, safrol), Resin, Sugars, Gum, starch, Albuminoids, Crudefibres, Organic Acid, Phytosterol, Zulenogaine, Camphor, Curcumene, Turmerone, Volatile oil. **ACTIONS:** Cooling, Carminative, Aromatic, Stomachic, Astringent, Apptizer **USED IN:** Cough, Skin disease, Itching, Lowering blood cholesterol, Chronic ulcer, Asthma, Fever, Colic, Stomatitis, Diabetes, Blood purifier useful to cure Eczema

6. ***Genetiana chirayita* Linn. GENTIANACEAE**

ENGLISH NAME: Chireta **HINDI:** Chirayta **PART USED:** Dried whole plant, Root, Stem and Flowers **DESCRIPTION:** A small shrub type herb, stem square, 2-4 feet high, Orange, Black or purple Flowers greenish-yellow. **TASTE:** Bitter **CHEMICAL CONSTITUENTS:** plant contains: A Bitter yellow acid (Ophelic acid), Glucosides (*Chiraytin andamarogenin*), Phenolics (Gentiopiecin and Swertion), Tannin, Calcium, Potassium, Gum, Mallic acid, Oleic acid, Palmitic acid and Stearic acid **ACTIONS:** Tonic, Stomachic, Febrifuge, Laxative, Diuretic, Anthelmintic, Anticancer, Antibacterial, increases thirst, Appitizer **USED IN:** Malarial fever, Leprosy, Leucoderma, Scabies, Neuro-muscular, Menorrhagia, Menstrual irregularity, Urinary disease, Heart disease, Indigestion, Asthma, Cough, Jaundice, Anaemia.

7. ***Mentha spicata* Linn. LAMIACEAE (LABIATAE)**

ENGLISH NAME: Spearmint **HINDI:** Pudina **PART USED:** Whole plant, Stem and Leaves **DESCRIPTION:** A small herb spreading on moist soil with suckers: Stem and branches are square. Flower white or bluish in spikes **TASTE:** Little pungent – Aromatic **CHEMICAL CONSTITUENTS:** Plant Contains: Essential oil, which gives smell of peppermint and contains more Thymol and Peppermint, Oil contains: Hydrocarbon menthon (Menthol) and Methyl acetate. **ACTIONS:** Anti fertility, Carminative, Refrigerant, Diuretic, Digestive, Appitizer, Tonic, Heart tonic **USED IN:** Antifertility, Anti-ovulatory, Gastrointestinal disorders, Anti-bacterial, Essential oil is significantly antifungal, Use in Dyspepsia, Cough, cold and Chronic fever

8. ***Syzygium aromaticum* Meril and Perry MYRTACEAE**

ENGLISH NAME: Clove tree **HINDI:** Laung **PART USED:** Dried flower bud with peduncle **DESCRIPTION:** A large shrub or medium sized tree, 9-12 meter high. Leaves simple opposite, undulate bright and glabrous flowers small and pale purple **TASTE:** Bitter – Acrid **CHEMICAL CONSTITUENTS:** Flower Bud contains: Beta-caryophyllene, Eugenol, Acetate, Methyl salicylate, N-Amylcarbinol, Benzyl alcohol, Furfural, Furfuryl alcohol, Vanillin, Eugenitine, Isoeugenitol, Eugenon, Galactose, Glucose, Fructose, Rhamnose, Sucrose, Xylose, Gallotanic acid and oleonic acid. **ACTIONS:** Stomachic, Appitizer, Carminative, Stimulant, Aromatic **USED IN:** cough, cold colic, Tuberculosis, Thirst, Appitizer, increases digestive enzymes, Anthelmintic, Cures Constipation, Asthma, Blood purifier, Diuretic, Flatulence+

9. ***Tinospora cordifolia* Miers. MENISPERMACEAE**

ENGLISH NAME: Tinospora / Guduchi **HINDI:** Gurich **PART USED:** Whole plant and Juice of fresh plant **DESCRIPTION:** An extensive climber with corky, grooved bark, leaves are cordate simple with long petiol, flowers small yellow in cluster, appear at leafless state **TASTE:** Bitter **CHEMICAL CONSTITUENTS:** Plant Contain: Starch, Glycoside (Gilon) Tinosporic acid, Vasa alcohol, essential oil, Vasa acid, Protein, Calcium. Phosporus, Berberine, Gilosterol **ACTIONS:** Astringent, Antipyretic, Rejuvenator, Blood purifier, Tonic, Diuretic, Anti-dote, Anodyne, anthelmintic, Antispasmodic **USED IN:** Pyrexia, Skin disease, Gout, Rheumatism, Arthritis, Sprue, Piles, Urinary calculi, Hypoglycaemic, Anti elergic, Anti-inflammatroy, general debility, Polyuria Leprosy flatulence, Dyspesia

10. *Allium sativum* Linn. LILIACEAE

ENGLISH NAME: Garlic **HINDI:** Lehsun **PART USED:** Bulb and Leaves **DESCRIPTION:** A small herb with half tunicated bulb; Leaves flat linear grass like, flowers white on a globose umbel **TASTE:** Acrid and sweet **CHEMICAL CONSTITUENTS:** Bulb contains: Avolatile oil wich contains Allyl-disulphide, Allyl-propyl disulphide and poly sulphide; Allicin (Antibcherial): Allicetion I and II (Antibiotics) **ACTIONS:** spermopoitic, Aphrodisiac, Oleative, Digestive, Bitter, Pungent, Bone healing, Tonic, Stomachic, Diuretic, antiseptic and Antibacterial **USED IN:** Malaria fever, Faltulacnce, Epilepsy, Tuberculosis, Ulcer, Ear troubles, Externally applied as Rubefaciant antiseptic, throat disorder, skin disease, bone ulcer, Chronic cough, Asthma, Bronchitis, Gangerene of lungs, Lobar pneumonia

11. *Ocimum sanctum* Linn. LAMIACEAE

ENGLISH NAME: Holy Basil / Sacred Basil **HINDI:** Tulsi / Ram tulsi **PART USED:** Whole plant, leaves, stem and seeds **DESCRIPTION:** An annual much branched, hairy herb with square stem. Leaves elliptic oblong, gland dotted, light green and aromatic. Flowers in verticillaster, purplish nutlets sub globose or broadly elliptic **TASTE:** Acrid-Bitter **CHEMICAL CONSTITUENTS:** Plant contains: Essential oil which contains: Eugenol, Eugenol methylether, carvacrol, Caryophyllene, Ursolic acid, Apigenin, Luteolin, Ascorbic acid, Carotene, Alkaloid, Glycoside, Saponins and Tannins **ACTIONS:** Expectorant, Diphoretic, Stimulant, Stomachic, Demulcent, Carminative, Heart tonic, Anthelmintic, Diuretic, Febrifuge, Vermifuge, Alexiteric **USED IN:** Rhinitis, Bronchitis, Malarial fever, Asthma, Urinogenital disorder, Vomiting, indigestion, Ear ache, Disuria, Leprosy, Dysracia. It a hepatoprotective, spermatopoitic, Antispasmodic, Anti-bacterial, Anti tuberculosis, cardiopanthic, Leucoderma, Catarohal, high cough

12. *Lantana camera* Linn. VERBENACEAE

ENGLISH NAME: Wild sage **HINDI:** Kuri / Ban tulsi **PART USED:** whole plant **DESCRIPTION:** A shrub with many recurved prickles and flowers of yellow white, orange colures **TASTE:** Acrid **CHEMICAL CONSTITUENTS:** Plants contains: Essential oil, which contains Camerene andm Micranene; Leaves: Lantadene, Arachidic acid, Linoleic aacid, Myristic acid, Palmitic acid, Citral, Eugenol, Furfural, Geraniol, Linalool, Alpha-amyrin, Beta-sitisterol, Lantanin acid, Lantadene – A& B, Veebascoses

and Lantanane **ACTIONS:** antiseptic, Carminative, Antispasmodic, Diphoretic **USED IN:** Healing wounds, Fistula. Decoction of whole plant is laxative and useful in Malaria and Rheumatism. Leaves cures snakebite.

13. *Piper nigrum* Linn. PIPERACEAE

ENGLISH NAME: Black pepper **HINDI:** Kalimirch **PART USED:** Berries (Fruits collected as soon as becoming red and dry) **DESCRIPTION:** A weak climber or trailing shrub growing on moist soil; Leaves are heart shaped with acute apex; Fruits in clusters **TASTE:** Strong Pungent / Acid-Bitter **CHEMICAL CONSTITUENTS:** Fruits Contains: Steroids, Alkaloids, Flavonoids, Tannins, Reducing sugars, Polysaccharides, Glycosides, and Saponins, Volatile Piperin **ACTIONS:** Stimulant, Carminative, Anti acidic, Anti periodic, Stomachic, Digestive Aromatic **USED IN:** Throat disease, Liver pain, Muscle pain, Piles, Spleen disorder, Flatulence, Indigestion

14. *Piper longum* Linn. PIPERACEAE

ENGLISH NAME: Long Pepper **HINDI:** Pipar **PART USED:** Roots, Dried unripe fruits (Dried Catkin) **DESCRIPTION:** A slender under shrub, creeping and rooting below, Branches rambling, Root is erect and thick; Leaves are delicate orbicular **TASTE:** Sweet Acrid **CHEMICAL CONSTITUENTS:** Root Contains: Alkaloids (Piper longumine, Piper Longuminine)Piperine; Essential oil which contains n-decanes, Alpha – Thujene, Terpenalene, Zinzerbene, Sesquiterpenes, Piplastine, Triocontane, Dehydro-stigmasterol, Reducing sugars, Glycosides seed contain:: Sylvatim Sesamine **ACTIONS:** Tonic, Alterataive, Rejuvenator, Digestive, Carminative, Aromatic, Purgative, expectorant, anthelmintic **USED IN:** Cough, Chronic bronchitis, Cold, Anti dote to snakebite, CNS stimulant, Anti-inflammatory, Anti-malarial, Antibacterial, Dyspepsia, throat disorder, Lumbago, Spleeno-megaly, asthma, epilepsy, insomnia, Gonorrhoea.

15. *Withania somnifera* Linn. SOLANACEAE

ENGLISH NAME: Rape seed plant / winter cherry **HINDI:** Asgandha **PART USED:** Roots, Leaves, Fruits, Seeds and whole plants **DESCRIPTION:** A small hairy under shrub, about 3-4 feet high branches are zigzag and clothed with stellate hair stout, root fleshy. Leaves simple cuneate, narrow at base and clothed with stellat hairs. Flowers in clusters, yellowish green, om axils. Fruits are berry enclosed with perisistant calyx. **TASTE:** Bitter, acrid **CHEMICAL CONSTITUENTS:** Root contains: Alkaloids (Somniferon) with aminon, Wasamin, Sugar, Glycosides. Amino acids, Essential Oil, withaniol, Hentriacontane phytosterol and oils; leaves contain: Withanoloids, Alkaloids, glycosides, Glucose, Amino acid Stem Contains: Protein fibres, Amino acid, Tannins, Flavonoids, Calcium and iron **ACTIONS:** Alternative, Aphrodisiac, Rejuvenator, Diuretic, Narcotic, Anti-purgative, tonic. Anti-inflammatory, analgesic, Antifungal, Antibacterial, alexipharmic, Somniferous **USED IN:** Roots: Fever, Painful swellings, Ulcer, carbuncles, Neurological disorder, Respiratory system, Cardiovascular system, Gastric activity, Leucoderma, Tuberculosis, Recketsia, Insomnia

16. *Zingiber officinale* Roscoe ZINGIBERACEAE

ENGLISH NAME: Zinger plant **HINDI:** Adrakh **PART USED:** Rhizome
DESCRIPTION: A small herb with horizontal, fleshy rhizome, leaves distichous, narrow oblong-lanceolate, lanceolate, flowers on long spike and are of purple colour on spike, small **TASTE:** Acrid Pungant **CHEMICAL CONSTITUENTS:** Rhizome Contains: Proteins, Fibres, Starch, Essential oil, Resin, Carbohydrate, Glucose, Fructose, Sucrose, Raphanis, Inulin, Globulin, Glutamin, Threonin, free Amino acids, Zingiberol, Zingiberin, Glutamic acid, Aspartic acid **ACTIONS:** Thermogenic Analgesic, Blood purifier, Carminative, Expectorant, Appetizer, digestive, Stimulant, Aromatic, Rubefacient, aphrodisiac, anti-emetic, febrifuge **USED IN:** Sciatica, joint problems, lumbago, Rheumatism, slip disc, gout, chronic arthritis, muscular trouble, Asthma, Cough, Chronic bronchitis, increase longevity of life, immunity against diseases, Haemorrhoids, dropsy ascites. elephantitis, flatulence, dysuria

17. *Elettaria cardamomum* Manton. ZINGIBERACEAE

ENGLISH NAME: Cardamum fruit **HINDI:** Chhoti elayachi **PART USED:** Dried fruit and seed **DESCRIPTION:** A perennial herb with thick root stock, leaves large lanceolate, elliptical, sheathing hairy below, flowers in panicle, from base, white capsule trilobular **TASTE:** Acrid **CHEMICAL CONSTITUENTS:** Seed contains: starch, Volatile oil which contains Cineol, Terpeneol, Terpene, Limonene, Sabinene and Terpeneol in the form of formic acid and acetic acid it also contains nitrogenous gum **ACTIONS:** Cooling powerful aromatic, stimulant, Carminative, Stomachic, Analgesic, Refracting, Diuretic **USED IN:** Cough, asthma, Piles, Tuberculosis, Dysuria, indigestion, Diarrhoea, Flatulence, Abdominal pain, Nausea, Vomiting, Scabies and throat disorder, urinary disorder.

18. *Trachyspermum ammi* Linn. UMBELLIFERAE

ENGLISH NAME: The Bishop's weed / Ajova seeds **HINDI:** Parseek ajwain **PARTS USED:** Leaves and Fruits **DESCRIPTION:** Annual aromatic, herb, 1-2 feet high, pinnate type dissected leaves Flowers: white and umbels **TASTE:** Acid Pungent **CHEMICAL CONSTITUENTS:** Plant contains: Volatile oil which contains: Thymol, Stearoptin Cymom, Terpene **ACTIONS:** Digestive, Stomachic, Spasmolytic, Stimulant, Tonic, Anthelmintic, appetizer, heart tonic **USED IN:** Diarrhoea, indigestion, Abdominal pain, Flatulence, Cholera, Heart disease, spleno-megally, spermatorrhea and gives colic relief.

The use of turmeric in feeding habit is very common and important part of Asian cooking and culture. It is documented that 6-7 gram/day orally / which is well tolerated (Gupta et al., 2020). It has been widely used as common household remedy for cough, sore throat and respiratory elements. Since December 2019, Corona virus disease caused by severe acute respiratory syndrome corona virus 2 (SARS-Cov-2) has spread rapidly throughout world. Lemons are rich in vitamin C (a natural antioxidant). According to Bondonno et al., (2019) lemon is the simple immunity booster. She said that having lemon juice containing 1 glass of Luke warm water, 1-2 table spoon fresh lemon juice, ¼ take soon spoon sea salt and ¼ table spoon honey (Optional) early in morning increases your immunity, which can effectively your body foreign particles. According to shloka of Charak Samhita, Giloy is one of the main herbs

with a bitter taste. The stem of Giloy is considered highly effective because of its high nutritional content and the alkaloids. Giloy can boost immunity, hence it is useful for various fever especially viral fever like corona infection. Giloy kadha or Giloy juice two times per a day for 4-6 week is very effective. Some studies suggests that a combination of Giloy and Ashwagandha provide a shield against deadly infection. All medicinal plants described in this review article are very useful against various type of infections. These plant extracts/ products get more importance when Union Health Minister (Government of India) Shri Harsh Vardhan released an “AYUSH Standard Treatment Protocol for clinical treatment of COVID-19 on 26 October, 2020”.

As above mentioned all eighteen medicinal plants are effectively used in Fever, Dry cough, Tiredness, Aches / pains, Sore throats, Headache and Diarrhoea, Breathing or shortness of breath, Chest pain or pressure and Loss of speech or movements used in Cough (Bramhvarshswa, 2006; Ambast, 2006, Bedi et al., 2008; Kim, 2009). Regarding huge population, our infrastructure (health system) and our vaccine production capability, in our country vaccination programme will continue for long time. As we know, COVID-19 different variant (as per changes in their structure) appears we believe that the infection will be as serious hazards to our health system for next period of 2-3 years. Use of these plant extracts of these medicinal plants boost our body strength (increase body immunity) till the vaccination is completed in our country. Immune system in body in body play an important role to fight against unhealthy environment and microbes such as virus, bacteria, fungus etc. since these medicinal plants having low cost, minimum toxicity and almost found everywhere in country and can reduce the infection of COVID – 19.

REFERENCE:

1. Ambasta, S.P. (2006): The useful plants of India published by National Institute of Science Communication Dr K S Krishnan Marg, New Delhi.
2. AYUSH Advisory for Corona virus 29 January, 2020 (Released ID: 1600895) www.ayush.gov.in/ayush_guideline.htm
3. AYUSH: Standard Treatment Protocol for Clinical Management of COVID – 19 released by Union Health Minister (Government of India) Shri Harsh Vardhan. 26 October, 2020
4. Backer, KHC (2005): New Trends in the utilization of Medicinal and Aromatic Plants. Acta Hort, 676: 11-23.
5. Bedi S., Tanuja, Vyas, S.P. (2008): A Hand Book of Aromatic and essential oil Plants Cultivation, Chemistry, Processing and Uses, AGROBIOS Publishers, India
6. Bondonno, N., Dalagard, F. and Murray, K. (2019): Flavonoid intake is associated with lower mortality the dassish, deiet cancer and health cohort. Nature Communication, 10 (3561): 71-82.
7. Brahmvarchas . (2006): Aruveda Ka Pran: Vanosadhi Vigyan. Yug Nirman Yojna, Gaytri Tapobhumi, Mathura – 6
8. Felsenstein, S., Herbert, JA., McNamara, PS and Hedrich, CM (2020): COVID – 19: Immunology and Treatment options. Clinical Immunology, 215:108448

9. Garcia R, Alves ESS, Santos MP, Vegas AGF, A Alberto R, Dos Santos RBV, Jose A, Fernandes PMB, (2008): Antimicrobial activity and potential use of monoterpenes as tropical fruit preservation. *Brazilian Journal of Micro biology*, 39, 163-169.
10. Gupta, H.; Gupta, M. and Bhargva, S. (2020): Potential use of turmeric in Covid-19. *Clinical and Experimental Dermatology*, 45(7): 902-903.
11. Jabbar, A., Sajjad, H., Julfiquar, F., Manohar., Khadija, Abid, H., Noorveen, S., Iqbal, Z., Ashraf, Md. and Quasim, M.D. (2020): Natural herbs as immunity booster against infectious diseases like COVID-19- A systematic Review. *International Journal of Biosciences* 17(2): 305-313
12. Kaushik, H. and Singh, V.K. (2020): Mathematics of COVID – 19 in India and their possible control by *Allium sativum* (L). *Asian Journal of Advances in Medical Science* 2(1): 21-29.
13. Khanna, K., Kaur, S.K. and Ahmad, P. (2020): Herbal immune – boosters: Sustainable warriors of Pandemic Covid – 2019 battle. *Phytomedicine* 85: 159361
14. Kim JH, Byun JC, Bandi AKR, Hyun C, Lee N.H. (2009): Compounds with elastase inhibition and free radical scavenging activities from *Callistemon lanceolatus*, *Journal of Medicine and Plant Research*, 3: 914-920.
15. Singh, SK., Singh, SK., and Singh, A. (2013): Molluscicidal and piscicidal properties of three common plants of family of Apocynaceae – A review. *Journal of Biology and Earth Science* 3(2): B194-B205.
16. Srivastav, A.K. and Singh, V.K. (2020): Mathematics of COVID – 19: A pandemic to public health. *Bio. Med. Research Journal*, 5(1): 299-304.
17. Srivastava RC and Srivastava, C. (2007): Diversity and economic importance of wetland flora of Gorakhpur district (U. P.) *J of Econ and Taxon Bot*, 31, 70-77.
18. Uniyal, SK., Awasthi A. and Rawat, G.S. (2002): Current status and distribution of commercially exploited medicinal and aromatic plants in upper Gori valley, Kumaon Himalaya, Uttaranchal. *Current Science*, 82, 1246-1252.
19. Vanila, D., Ghanthikumar, S. and Manickam, V.S. (2008): Uses of Plants in the Plains Area of the Tirunelveli-District, Tamilnadu, India. *Ethnobotanical Leaflets*, 12, 1198-1205.
20. Wogiatzi E, Gougoulas N, Papachatzis A, Vegelas I, Chouliaras N, (2009): Greek oregano essential oil production, phytotoxicity and antifungal activity, *Biotechnol & Biotechnol*, 23, 1150-1152.