

A Study of Antiviral and Immuno-Modulator Traditional Medicinal Plants from Jharkhand with Reference to Covid -19

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ABSTRACT: India is a country inhabited by a large number of people having diverse ethnic group. There are over 400 different tribes and other ethnic groups residing mostly in rural areas in India and most of them are still living in remote forest area, who depend to a great extent on the indigenous system of medicine. People living in Jharkhand widely use medicinal plants for boosting immunity and managing infection. The aim of this study was to document the medicinal plant species used by herbalists to boost the immune system of people to combat Covid-19 Pandemic. A list of 119 plants with their taxonomic position and chemical constituents is available here for further investigation.

KEYWORDS: Antiviral, Immuno modulator, Traditional Medicinal Plants, Covid-19.

I. INTRODUCTION

Since time immemorial mankind has used plant extracts from different plants to cure many diseases and thus relieve him from physical agony (1). In our country, the traditional herbal medicines play important role in health care of rural people for all types of ailments. The healing power of traditional herbal medicines have been realized and documented since Rigveda and Atharbaveda (2). Since then plants and their extracts have been used therapeutically and even today plant based medicines continue to play an essential role in world health care(3). Today according to WHO as many as 80% of world's people depend on traditional medicine for their primary health care, most of which involve the use of plant extract (4).

In recent years many researchers have focused on medicinal plants derived from natural products due to their wide range of Pharmacological significance(5). Moreover, natural resources of vegetable origin represent an important source of drugs in the process of developing new pharmacologically active compound (6). The World Health Organisation (WHO) established that in many developing countries, traditional medicine plays an important role in health needs of the population and highlights specific types of medicine.(7).

Covid 19 is a newly identified strain of corona virus that causes effects similar to the common cold of the fatal disease across the world (8). It is the virus which attacks the respiratory system of the human being. Over one million people throughout world died due to this virus, since last 6 months it has creates havoc in the world. It is the most affective pandemic of the century. It was first identified in early December 2019 (9). The major cases were reported in mainland china, followed by the Italy, Iran, Spain and South Korea,(10) now it has covered 200 countries of the world with a great death toll (11). It has also done a great damage to the lines as well as economy of our country and world.

The common symptoms are fever, cough and shortness of breath. In several cases, pneumonia and thrombosis which ultimately lead to organ failure and even death (12) So far no perfect drug to control this virus has been discovered by any of the various systems of medical field across the world. Various treatment modalities have been considered, traditional medicine, which has been widely used during the past epidemic outbreaks, such as severe acute respiratory syndrome (SARS) and (H1N1) influenza (13). The science of medicine, whether traditional or folkloric, has undergone a phenomenal growth with a communicant increase of interest among the plant scientists, Ethno botanists, Anthropologists, Pharmacologists etc. The use of traditional knowledge is always useful in achieving the target of health (14).

In the present paper a list of plants used for common symptoms of Covid-19 and other antiviral and immune-modulator traditional plants is depicted for further investigation.



II. METHODOLOGY

Semi structured questionnaires and interviews were administered to some local herbalists (viz medicine men, hakims and old age people) with knowledge of folklore medicine from different villages of Jharkhand. The methodology used is based on methods available in literature. (15,16). A detail literature, review of the Pharmacology, phytochemistry and other traditional uses of the documented medicinal plants was also conducted. Gathered ethnobotanical information can be used for research and a drug with multiple combinations of herbs with antiviral and immune-modulator in reference to Covid-19 may be prepared. The documented data prepared is summarized in a Table. The collection of plants material with local is done between 2016-2019. Plant identification was carried out by using different floras. Plants used were compared with published literature (17,18). The voucher specimens are deposited in Department of Botany . N.P.University, Medininagar.

Table No : I

Sr.no.	Scientific name	Common name	Family	Parts used	Phytochemicals	Recipe
1.	<i>Abrus precatorius L.</i>	Gunj	Fabaceae	Leaves, Root	Glycyrrhizin, triterpene glycosides, pinitol and alkaloids.	Decoction of fresh leaves or roots.
2.	<i>Abutilon indicum (Link) Sweet</i>	Kanghi	Malvaceae	Seeds	Alkaloids, flavonoids, carbohydrates, phenolic compounds and saponins	Mucilage of seeds.
3.	<i>Acacia nilotica (L.) Del. /Vachella nilotica(L.)P.J.H. Hurter&Mabb.</i>	Babul	Mimosaceae	Bark	Catechin, epicatechin, dicatechin, quercetin, gallic acid and procyanidin.	Decoction of bark.
4.	<i>Acacia catechu(L.F) wild /Senegalia catechu(L.f.) P.J.H. Hurter&Mabb.</i>	Khair	Mimosaceae	Bark	saponins, tannins, amino acids, phenols, carbohydrates, proteins, flavonoids, steroids, alkaloids and glycosides.	Decoction of bark
5.	<i>Acalypha indica L</i>	Kuppi	Euporbiaceae	Leaves, Root	Saponins, flavanoids and amino acids.(B)24	Decoction of leaves or root.
6.	<i>Achyranthes aspera L.</i>	Chirchita	Amaranthaceae	Root, Seeds	Alkaloid, saponin, coumarin, tannin and phenol, reducing sugars, flavonoid, steroids and triterpenoid.	Pinch of root or seeds powder with equal amount of black pepper with honey.
7.	<i>Adina cordifolia(wild roxb)</i>	Karam	Rubiaceae	Bark	Flavonoids, Phenol, Carbohydrates, Alkaloid, Saponin, Tannins Phlobatanins, Terpenoids, Cardiac glycosides.	Decoction of bark of stem or Heart Wood.
8.	<i>Adhatoda zeylanica (L.)/Justicia adhatoda (l.)</i>	Vasaka	Acanthaceae	Leaves	Quinones, coumarins, terpenoids, phenols, saponins, flavonoids, volatile oils, resins, gums and mucilages and tannins.	Decoction of 2 leaves with handful leaves of Ocimum species and 1/2 leaf of Eucalyptus globulus Labill.
9.	<i>Aegle marmelos (L.) Corr.</i>	Bel	Rutaceae	Fruit	Coumarins, betasitosterol and xanthotoxin.	Fruit pulp drink
10.	<i>Ailanthus excelsa Roxb.</i>	Maharukh	Simaroubarceae	Bark, Leaves	Quassinoids, kaempferol and luteolin	Vapours of boiling bark or leaves (Decoction bark or leaves)
11.	<i>Aloe vera(L.)Burm.f.</i>	Ghritkumari	Asphodelaceae	Gel	Alkaloids, phenols, flavonoids, saponins, and terpenes.	Applied on skin or Orally taken
12.	<i>Allium cepa L.</i>	Pyaz	Amaryllidaceae	Bulb	Flavonoids, phytosterols and saponins.	Juice of Bulbs
13.	<i>Allium sativum L.</i>	Lehsun	Amaryllidaceae	Bulb	Carbohydrates, flavonoids and saponins.	Two bulbs with honey
14.	<i>Andrographis paniculata(Burm.f.) Nees</i>	Kalmegh	Acanthaceae	Leaves	Alkaloids, steroids, flavonoids, tannins, Tri-terpenoids, Quinones, Protein, Sugars, Gum.	Juice of leaves
15.	<i>Anisomeles malabarica(L.) R. Br.Ex.Simg.</i>	Kala bhangra	Lamiaceae	Leaves	Alkaloid, flavonoids, saponins, tannins, and terpenoids.	Decoction of fresh leaves.

16.	<i>Anogeissus latifolia</i> (Roxb.ex.Dc.) Wall. Ex. Guill&Perr	Dhauta	Combretaceae	Bark	Mannose, galactose and arabinose.	Bit of bark is kept in mouth for 3 - 4 times a day.
17.	<i>Argemone mexicana</i> L.	Bakula	Papaveraceae	Root	Isoquinoline alkaloids, Alkaoids, Aliphatic and Phenolic compounds	Decoction of root
18.	<i>Aristolochia indica</i> L.	Eshwaramooli	Aristolochiaceae	Root	Reducing sugars, combined reducing sugars, glycosides, tannins, alkaloids, acidic compounds, steroids, terpenoids and flavonoids.	The paste of fresh root is applied over chest for children
19.	<i>Aristolochia bracteolata</i> Lam.	Gadh	Aristolochiaceae	Root	Phenols, Terpenoids, Tannins, Flavonoids, Glycosides, Carbohydrates in methanol extract .	Paste of root
20.	<i>Asparagus racemosus</i> wild.	Satawar	Asparagaceae	Root	Alkaloids, Glycosides, Phenolic compound, Tannins, Saponins, Steroids, Flavonoids and Carbohydrates.	Juice of root
21.	<i>Bacopa monnieri</i> (Linn.) Penell.	Brahmi	Scrophulariaceae	Whole plant	Tannins, flavonoids, glycosides, terpenoids, saponins, and steroids.	A poultice of the boiled plant on the chest of small children.
22.	<i>Balanites aegyptica</i> (L.) Delile.	Hingot	Zygophyllaceae	Root	Saponins, flavonoids and alkaloids.	Root decoction
23.	<i>Bambusa arundinacea</i> (Retz.)	Bans	Poaceae	Leaves	Flavonoids, steroids, tannins, quercetin, phenols and quinines.	Decoction of leaves
24.	<i>Bauhinia racemosa</i> Lamkark.	Kathmuli	Caesalpiniaceae	Flower , Leaves	Tannins, alkaloids, glycosides, steroids and saponins.	Dried leaves powder is smoked as cigarette and decoction of flowers and leaves.
25.	<i>Boerhavia diffusa</i> L.	Punarra	Nyctaginaceae	Whole plant	Flavonoids, alkaloids, glycosides, steroids, triterpenoids, lipids and lignans.	Decoction of plant.
26.	<i>Boerhavia erecta</i> L.	Shweta	Nyctaginaceae	Whole plant	Glycosides, flavonoids, tannins, saponins, alkaloids, phenolics, and ferric chloride.	Decoction of plant.
27.	<i>Boswellia serrata</i> Triana & P lanch.	Shallaki	Burseraceae	Bark	Sabinene, terpinen-4-ol and terpinyl acetate.	Decoction of bark.
28.	<i>Butea monosperma</i> Lamk.Taub.	Palash	Fabaceae	Gum	Flavonoids, tannins, saponins, carbohydrates, terpenoids, alkaloids, proteins, quinones, phenols and glycosides.	Gum mixed with water.
29.	<i>Caesalpinia crista</i> (L.)	Latakanj	Fabaceae	Seeds	Alkoids, Cassane-diterpenes, Flavonoids, Norcassane diterpenes, proteins, Saponins, Triterpenoids, etc.	Juice of bark
30.	<i>Calotropis gigantea</i> (L.) R.Br.ex. Schult.	Madar	Asclepiadaceae ,Now Acc to APG Sys. Apocynaceae	Flower	Calactin, calotropin, and calotoxin.	Pinch of flower in betel leaf.
31.	<i>Calotropis procera</i> (Ait.) R. Br.	Safedak	Asclepiadaceae ,Now Acc to APG Sys.	Flower	Saponin, coumarin, tannin and phenol, reducing sugars and triterpenoid.	Pinch of dried flowers powder is mixed with Piper nigrum, slight common salt

			Apocynaceae			and jiggery.
32.	<i>Careya arborea Roxb</i>	Kumbhi	Lechythidaceae	Bark, Flower	Tannins, saponions, sapogenol, hexacosanol, quercetin, ellagic acid, taraxerol, β -sitosterol and α -spinasterol.	Pinch of flower and fresh bark mixed with honey.
33.	<i>Cassia fistula L.</i>	Amaltas	Fabaceae	Leaves	Arrntraquinones, Flavonoids and Flavan-3-ol derivatives.	Juice or decoction of leaves
34.	<i>Cassia occidentalis(L.)Link / Senna occidentalis(L.) Link</i>	Kasunda	Fabaceae	Root	Achrosin, Aloeemodin Emodin, Anthraquinones, Anthrones, Apigenin, Aurantiobtusin, Campsterol, Cassiollin, Chryo-obtusin, Chryso Phanic acid, Chrysarobin, Chrysophanol etc.	Root decoction
35.	<i>Celosia argentea L</i>	Garkha	Amaranthaceae	Whole plant	Celogenamide A, celogentin A-D, Celogentin-H, celogentin-J and celogentin - K and moroidin.	The ash of whole plant with water.
36.	<i>Chrysanthemum indicum L</i>	Guldau di	Asteraceae	Whole plant	Chrysanthemin, cyaniding and stachydrine.	Decoction of plant
37.	<i>Cissampelos pariera L.</i>	Parhi	Menispermaceae	Root	Alkaloids, Flavonoids, Tannins, Volatile oils and Glycosides .	Root decoction
38.	<i>Clerodendrum serratum (L.) Moon.</i>	Bharangi	Verbenaceae Now acc. to APG sys. Lamiaceae	Leaves	Saponins, terpenoids, steroids and flavonoids.	The leaf juice is mixed with dried fruit powder of Piper nigrum.
39.	<i>Clitoria ternatea Linn.</i>	Aprajita	Fabaceae	Root	Phlobatannin, anthraquinone and anthocyanins.	Root juice is given with cold milk.
40.	<i>Cordia dichotoma Forst.f.</i>	Lasora	Boraginaceae	Bark , Fruit	Saponin, coumarins, triterpens and flavonoids,	Decoction of bark 50 ml or fruit 15 ml per day.
41.	<i>Cryptolepis buchananii R.Br.ex Roem.&Schult</i>	Karanta	Apocynaceae	Root	(+)-3-hydroxy- β -ionone (2), (3R, 6R, 7E)-3-hydroxy-4, 7-megastigmadien-9-one (3), ficusic acid (4), (+)-pinoresinol (5), (+)-8-hydroxypinoresinol (6), (+)-syringaresinol (7), diaaurantiamide acetate (8), loliolide (9), (-)-balanophonin (10), chrysoeriol (11), 9-hydroxy-10E, 12Z-octadecadienoic acid methyl ester (12), and ficesquilignan A (13).	Decoction of root as tonic
42.	<i>Curcuma longa L.</i>	Haldi	Zingiberaceae	Rhizome	Curcuminoids, Curcumin, demethoxycurcumin and bisdemethoxycurcumin, volatile oils, sugars, proteins and resins.	Pinch of dried rhizome powder with warm water.
43.	<i>Curcuma pseudomontana J.</i>	Kachura	Zingiberaceae	Rhizome	Alkaloid, glycoside, steroid, flavonoid, tannin, saponin,	Pinch of dried rhizome powder with warm water.

	<i>Graham, Cat.</i>				phenol, terpenoids and phytosterol.	
44.	<i>Curcuma caesia</i>	Kali haldi	Zingiberaceae	Rhizome	Alkaloids, phenols, phytosterols, terpenoids, carbohydrates, tannins, glycosides, saponins, quinones, amino acids, oils and flavonoids .	Can be crushed and applied, decoction Of fresh rhizome
45.	<i>Cynodon dactylon (L.) Pers.</i>	Doob	Poaceae	Whole plant	β - sitosterol, β - carotene, vitamin C, palmitic acid, triterpenoids, arundoin, friedelin, selenium, alkaloids- ergonovine, ergonovine, Ferulic, syringic, p- coumaric, vanilic, p hydroxybenzoic and o-hydroxyphenyl acetic acids, Cyanogenichyperoside, anogenicglucoside- triglochinin, furfural, furfural alcohol, phenyl acetaldehyde, acetic acid, phytol, β - ionone; mono and oligosaccharides and lignin.	Whole plant juice mixed with honey.
46.	<i>Cyperus rotundus L.</i>	Motha	Cyperaceae	Tubers	Carbohydrates, alkaloid, tannins, and glycosides.	Tubers decoction
47.	<i>Datura metel L.</i>	Safed dhatura	Solanaceae	Leaves Fruit	Alkaloid, Reducing sugars and Triterpenoid.	The dried leaves powder or fruit powder is smoked
48.	<i>Desmodium gangeticum (L.) DC.</i>	Sinar	Fabaceae	Root	Alkaloids, carbohydrates, glycosides, phytosterol and flavonoids.	Root decoction with Piper nigrum
49.	<i>Dioscorea bulbifera L.</i>	Darukanda	Dioscoreaceae	Tubers	Steroids, flavonoids, cardiac glycosides, saponins, reducing sugars, anthraquinones, phlobatanins and tannins.	Soup of tubers
50.	<i>Diospyros melanoxylon Roxb.</i>	Tendu	Ebenaceae	Seed oil, Bark	alkaloids, carbohydrates, flavonoids, aminoacids, glycosides, tannins, proteins, steroids and saponins in the plant. The various constituents such as beta-Sitosterol, lupeol, betulin and betulinic acid have been isolated from the bark and sapwood. Leaves are found to contain alpha-amyrin, ursolic, corsolic acid.	Dried powder of bark and seed
51.	<i>Eclipta alba (L.) Hassk.</i>	Bhringraj	Asteraceae	Leaves	Alkaloids, flavonoids, glycosides, polyacetylenes and triterpenoids.	The 2-3 drops of leaves juice is mixed with equal quantity of honey.
52.	<i>Elephantopus scaber L.</i>	Gobhi	Asteraceae	Root	quinones, steroid, flavonoids, phenols, cardiac glycoside, cholesterol, tannins and terpenoids. Aqueous extract could indicate presence of saponins .	Decoction of root
53.	<i>Emblica officinalis Gaertn.</i>	Amla	Euphorbiaceae	Leaves, Fruit	quercetin, phyllemblic compounds, gallic acid,	Decoction of leaves and fruit juice.

					tannins, flavonoids, pectin, and vitamin C, terpenoids, carbohydrates, and tannins.	
54.	<i>Erygium foetidum L.</i>	Jungli dhaniya	Apiaceae	Leaves, Whole plant	flavonoids, tannins, a saponin and several triterpenoids.	Decoction of leaves and whole plant
55.	<i>Euphorbia hirta L.</i>	Bada dudhi	Euphorbiaceae	Leaves	Alkaloids, saponins, tannins, cardiac glycosides, steroids and flavonoids.	The pills are prepared from crushed leaves and jaggery.
56.	<i>Evolvulus alsinoides L.</i>	Shankhpushpi	Convolvulaceae	Whole Plant	Glycosides, alkaloids, polyphenols, carbohydrates, amino acids and proteins, saponins, volatile oil, flavonoids and tannins.	Dried whole plant crushed is made into cigarettes.
57.	<i>Ficus hispida L.</i>	Phalgu	Moraceae	Leaves	Alkaloid, phenolic compounds, flavonoid and glycosides.	Young fresh leaves pounded with milk and Piper longum.
58.	<i>Ficus racemosa L.</i>	Goolar	Moraceae	Fruit	Phenols, flavonoids and alkaloids.	The dried ripe fruits are mixed with jaggery.
59.	<i>Gloriosa superba L.</i>	Karihari	Colchicaceae	Leaves	Colchicine, alkaloids, β -sitosterol and glucoside.	The leaves paste applied on forehead and neck of children.
60.	<i>Glycyrrhiza glabra Linn.</i>	Mulethi	Fabaceae	Root	alkaloids, glycosides, carbohydrates, starches, phenolic compounds, flavonoids, proteins, pectin, mucilage, saponins, lipids, tannins, sterols and steroids.	Powder of root
61.	<i>Gymnema sylvestre (Retz.) R.Br. ex Schult.</i>	Gurmar	Asclepiadaceae, Now Acc. To APG sys. Apocynaceae	Leaves	Alkaloids, flavonoids, phenols, tannins, terpenoids carbohydrate, tannin, and saponin.	Leaves juice
62.	<i>Helicteris isora L.</i>	Maror phalli	Sterculiaceae	Bark	Tannins, phenolic compounds, amino acids, carbohydrates, phytosterols, triterpenoids and alkaloids.	Decoction of Bark
63.	<i>Hemidesmus indicus (L.) R. Br.</i>	Anantmul	Apocynaceae	Root	Flavonoid, Steroid, Phenol, Terpenoid, Anthraquinone, Cardiac glycoside, and Tannin.	Decoction of root
64.	<i>Hibiscus rosa-sinensis L.</i>	Gurhal	Malvaceae	Leaves, and root	Flavonoids, glycosides, phytosterols, terpenoids and tannins,	Decoction of leaves or root or fruits.
65.	<i>Holarrhena antidysentrica Ssensu.Wall. ex. DC.</i>	Hat dudhia	Apocynaceae	Bark	Flavonoids, alkaloids and tannins.	The root bark powder is mixed with boiled water.
66.	<i>Ipomoea quamoclit L.</i>	Kamlata	Convolvulaceae	Leaves, Stem	Quamoclin I-IV and jalapin.	Decoction of leaves and stems.
67.	<i>Lagenaria siceraria (Mol.) Standl.</i>	Kaddu	Cucurbitaceae	Fruit	β -sitosterol, ampesterol and isoquercitrin.	Juice of the fruit.
68.	<i>Lagerstroemia indica L.</i>	Sawani	Lythraceae	Flower	Anthraquinones, reducing sugars, terpenoids, flavonoids, saponins, tannins, alkaloids and cardiac glycosides.	Decoction of flowers.
69.	<i>Lawsonia inermis L.</i>	Mehendi	Lythraceae	Leaves	Alkaloids, Quinones, Glycosides, Tannins and	The leaves juice mixed with water and sugar.

					saponins.	
70.	<i>Leptadenia reticulata</i> (Retz.) Wight & Arn.	Meethi dodhi	Apocynaceae	Leaves	Apigenin, reticulin, deniculatin, and leptaculatin.	The leaves juice mixed with honey.
71.	<i>Leucas aspera</i> (Willd.) Link	Chota halkusa	Lamiaceae	Whole Plant	alkaloids, glycosides, steroids, lignans, flavonoids, terpenoids,oleanolic acid, ursolic acid, 3-sitosterol, nicotine, sterols and galactose, glucoside.	Decoction of whole plant with equal amount of leaves of Ocimum sanctum.
72.	<i>Leucas cephalotes</i> Spreng. (Roth).	Drona pushpin	Lamiaceae	Leaves	Labdane, A bietone-type, diterpenes named leucadins A (1), B (2), C (3).	leaves juice
73.	<i>Madhuca longifolia</i> (J.Konig) J.F.Macbr. (J.Konia) Maebr	Mahua	Sapotaceae	Flower	Quercetin, β -amyrindecenate, β -amyrin, β -amyrin acetate, stigma sterol and β -amyrincinamate.	Fresh juice of flowers.
74.	<i>Melia azedarach</i> L.	Bakain	Meliaceae	Bark, Leaves	Alkaloids, Tannins, Saponins, Phenols, glycosides, steroids, terpenoids and flavonoids.	Decoction of bark and leaves juice
75.	<i>Meyna laxiflora</i> Robins	Mauna	Rubiaceae	Fruit, Leaves	carbohydrates, starch, proteins, tannins, saponins and alkaloids .	Fruits as pickle and paste of leaves
76.	<i>Mimosa pudica</i>	Lajjawati	Fabaceae	Root, Leaves	terpenoids, flavonoids, glycosides, alkaloids, quinines, phenols, tannins, saponins and coumarin .	The juice of root and leaves and decoction of root
77.	<i>Mitragyna parvifolia</i> (Roxb.) Korth	Kadamb	Rubiaceae	Bark, Leaves, Fruit	Carbohydrate, Alkaloid, Phenols, Tanins and phytosterol .	Fresh leaf sap, decoction of bark, fruit juice
78.	<i>Momordica dioica</i> Roxb. ex Willd.	Kheksa	Cucurbitaceae	Root	Alkaloids, terpenoids, flavonoids, anthraquinones, tannins, saponins, glycosides, reducing sugars, steroids and cardiac glycosides.	Root paste in water.
79.	<i>Moringa oleifera</i>	Sahjan	Moringaceae	Leaves	Tannins, terpenoids, flavonoids, alkaloids, steroids etc.	Leaves decoction and dried leaves powder as soups.
80.	<i>Morus alba</i> L.	Shahtot	Moraceae	Leaves	ascorbic acid, of which over 90% is present in a reduced form, and also contains carotene, vitamin b1, folic acid, folinic acid, isoquercetin, quercetin, tannins, flavonoids and saponins.	Powdered leaves are taken
81.	<i>Nelumbo nucifera</i> Gaertn.	Kamal	Nelumbonaceae	Seeds	Saponins, phlobotannins, flavonoids, tannins, sterols and phenols.	The seeds powder mixed with honey.
82.	<i>Nyctanthus arbor-tristis</i> L.	Harsingar	Oleaceae	Leaves	Flavonoid, saponins, alkaloids and coumrins.	Decoction of leaves
83.	<i>Ocimum tenuiflorum</i> L.	Tulsi	Lamiaceae	Leaves	tannin, flavonoid, and glycoside saponin etc.	Decoction of leaves.
84.	<i>Ocimum americanum</i> L	Kali tulsi	Lamiaceae	Leaves	Chavicol, camphor and linalool etc.	Decoction of leaves

85.	<i>Opuntia elatior Mill.</i>	Nag phani	Cactaceae	Whole plant	Flavonoids, flavonone carbohydrates, tannins, sterols, proteins, pectin, citric acid and vitamin C.	Whole plant juice
86.	<i>Panax ginseng C.A.Mey.</i>	Ginseng	Araliaceae	Root	Ginsenosides, ginseng polysaccharides, volatile oils (terpenoids, alcohols, fatty acids, etc.), peptides, and amino acids.	Dried root powder
87.	<i>Pergularia daemia (Forssk.) Chiov.</i>	Dholi dudhi	Asclepiadaceae/Now Acc to APG Sys. Apocynaceae.	Leaves	Tannins, flavonoids, alkaloids, steroids, and quinines.	Extract of leaves
88.	<i>Phyllanthus niruri</i>	Bhui amla	Phyllanthaceae	Leaves	Flavonoids, alkaloids, terpenoids, lignans, polyphenols, tannins, Caumarins and saponins.	Juice of the fruit.
89.	<i>Picrorhiza Kurroa Royle ex Benth</i>	Kutki	Plantaginaceae	Root, Rhizome	veronicoside, pikuroside, phenol glycosides, 4-hydroxy-3-methoxy acetophenone and cucurbitacin glycosides as the major constituents.	Root or rhizome powder
90.	<i>Piper Longum Linn.</i>	Long	Piperaceae	Fruit	Alkaloid, saponin, coumarin, tannin and phenol, reducing sugars, steroids and triterpenoid..	Decoction of immature fruits
91.	<i>Plantago asiatica L.</i>	Isabgol	Plantaginaceae	Leaves	iridoids, flavonoids, tannins, triterpenes, saponins, and sterols .	Decoction of leaves
92.	<i>Pongamia pinnata (L.) Pierre.</i>	Karanja	Fabaceae	Leaves	Pongone, Galbone, Pongalbol, Pongagallone A and B.	Decoction of leaves
93.	<i>Pterocarpus marsupium Roxb.</i>	Vijayar	Fabaceae	Bark	Glycosides, saponins, tannins and flavonoids.	.Aqueous extract of the wood.
94.	<i>Randia dumetorum Thunb, Tirveng.</i>	Kharhar	Rubiaceae	Bark, Leaves, Fruit	Bark- mannitol, saponins, coumarin glycosides. Root bark- triterpene, -1keto-3-hydroxyoleanane. Leaves-iridoid-10-methylxoside Fruit- glycosides, randioside A, mollisidial triterpenoid glycosides and randianin, six saponinsdumetoronins A to F . A hemolytic triterpenoid saponins that is Randianin, from fruit of R. dumetorum .	Internal use of bark, paste of bark ,fruit crushed and pulp soaked in water. Leaves decoction.
95.	<i>Senna tora L.</i>	Charota	Fabaceae	Seeds	Tannin, saponin, protein, steroids, terpenoids, carbohydrate, alkaloids, flavonoids and glycosides.	The dried seeds powder
96.	<i>Sida rhombifolia L.</i>	Sahadev	Malvaceae	Root , Leaves.	Alkaloids, Saponins, Flavonoids, Proteins, Tannins, Terpenoids and Glycosides	Decoction of roots and leaves
97.	<i>Smilax zeylanica L.</i>	Ram datoon	Smilacaceae	Root	Carbohydrates, Reducing sugar, Saponin, Protein, Alkaloids and	Decoction of root

					Tannin. Carbohydrates, Reducing sugar, Saponin, Protein, Alkaloids and Tannin. Carbohydrates, reducing sugars, proteins, saponins, flavonoids, Alkaloids, and tannins.	
98.	<i>Spilanthus calva</i>	Akarkar	Asteraceae	Whole plant	glycosides, tannins, carbohydrates, flavonoids, alkaloids gums, phenolic compounds, steroids, proteins & amino acids, acidic compounds etc.	Dried fruits powdered and mixed with Coconut oil and then used crushed aerial Parts in a paste dressing for external injuries.
99.	<i>Solanum indicum L.</i>	Jangli bhata	Solanaceae	Fruit	Sesquiterpenoids and coumarins.	Fruit is pounded and fried in butter
100.	<i>Solanum nigrum L.</i>	Makoi	Solanaceae	Fruit	Epicatechin, rutin, and naringenin.	Decoction of berries
101.	<i>Solanum virginianum L.</i>	Kateli	Solanaceae	Root	Alkaloids, terpenoids, glycosides, flavonoids, saponins, coumarins, tannin.	Decoction of root
102.	<i>Sterculia urens Roxb.</i>	Kulu	Malvaceae	Gum	saponins, tannins, amino acids, phenols, carbohydrates, proteins, flavonoids, steroids, alkaloids and glycosides.	Used as bulk laxative
103.	<i>Thalictrum foliolosum DC.</i>	Jurbula	Ranunculaceae	Root	Alkaloids such as berberine, jatrorrhizine, palmatine, thalrugosidine, thalrugosaminine, thalisopine (thaligosine), thalirugidine, thalirugine, 8-oxyberberine (berlambine), noroxyhydrastinine, N,O,O-trimethylsparsiflorine, thalicarpine, thalidasine, thalfoliolosumines A and thalfoliolosumines B.	1-3 gram root powder
104.	<i>Terminalia arjuna (Roxb. ex DC.) Wight & Arn.</i>	Arjun	Combretaceae	Bark	phytosterol, lactones, flavonoids, phenolic compounds and tannins and glycosides.	Decoction of bark and its powder with water
105.	<i>Terminalia bellirica (Gaertn.) Roxb.</i>	Baheda	Combretaceae	Fruit	Alkaloid, Flavonoid, Glycoside, Cardiac glycosides, Phenolic, Steroid, Terpenoid, Lignans, Tannins and Phlobatannins	The cortical part of dried fruit is kept into the mouth

III. RESULTS

Information on plant species used especially for the antiviral and immune system booster are summarized in **Table No. 1 and Fig. No.1**. 119 medicinal plants species from 43 family and 105 genera identified the majority of herbal medicines were made from leaves, bark, stem, roots, whole plant. These crude drugs were used as decoction or infusion of whole plant, leaf, bark, flower, fruit and seeds are used internally, as the traditional herbal remedies are based on ancestral knowledge and empiric experiences, they had been cross checked by literature previously reported for antiviral and antibacterial diseases (19,20,21). Further extensive Ethno-botanical and Ethno- Pharmacological study

may lead to the exploitation of plants and compounds for these properties. The correct botanical name, family, common name, part used, recipe and phytochemicals of the plants as per data available is depicted in Table no.1 and Fig. No. 1

106.	<i>Terminalia chebula Retz.</i>	Harra	Combretaceae	Fruit	chebulic acid, gallic acid, ellagic acid, tannins acid, amino acid, flavanoids, like luteolin, rutins and quercetin etc.	The fresh fruit dipana and the powdere D dried fruit made into a paste and tak en with jiggery.
107.	<i>Tinospora cordifolia(wild.)Miers.</i>	Giloy	Menispermaceae	Stem	carbohydrates, glycosides, flavonoids, phenols, tannins and amino acids.	Powder of dried Stem
108.	<i>Tribulus terrestris L</i>	Gokhr u	Zygophyllaceae	Whole plant	Flavonoids, saponins, steroidal glycosides, saponins, saponins, furostanol glycosides and alkaloids.	Decoction of plant
109.	<i>Urginea indica Kunth</i>	Ban piyaz	Asparagaceae	Bulb	phenol, flavonoid, tannin, saponin and alkaloid(e)	Juice of the bulb 15-20 ml.
110.	<i>Vernonia cineria(L.)Less.</i>	Kaliziri	Asteraceae	Leaves	alkaloid, anthraquinone, coumarin, tannin, glycoside, xanthoprotein and sugar,steroids,triterpinoids,esters .	The dried leaves are smoked
111.	<i>Vitex negundo L.</i>	Sindwar	Lamiaceae	Leaves, Root, Bark	essential oil, triterpenes, diterpenes, sesquiterpenes, lignan, flavonoids, flavones glycosides, iridoid glycosides, and stilbene derivative.	The leaf juice ,root and bark powder
112.	<i>Wattakaka volubilis(L.F)Stapf.</i>	Nak-chikni	Apocynaceae	Roots, Leaves	alkaloids, terpenoids, saponins, tannins, flavonoids,terpenoids phenols, glycosides.	Paste of the roots is applied and the pas te of bark ,combined with milk
113.	<i>Withania somnifera (L.) Dunal.</i>	Aswagandha	Solanaceae	Leaves , Root	Alkaloids Withanine, somniferine, somnine, somniferinine, withananine, pseudo-withaninetropane, pseudo-tropine, choline, anaferine, anahydrine and isopelletierine,.	Leaf and root juice
114.	<i>Woodfordia fruticosa (L.) Kurz</i>	Dhatak i	Lythraceae	Root, Flower	tannin, glycoside, phytosterol, fixed oil and fat, carbohydrate, saponin, and gums protein, fixed oil, glycoside, carbohydrate, terpenoid, steroid, tannin, and saponin.. .	Decoction of flower and root
115.	<i>Wrightia tomentosa(roxb.)Reom. & Schult.</i>	Kari dudhi	Apocynaceae	Leaves	alkaloids, ellagic acid, iridioids, lignans, methylene dioxy compounds, steroids, tannins and triterpenoids unsaturated sterols, terpenes, flavonoids, phenolic acids and alkaloids.	Juice of the leaves
116.	<i>Xanthium strumarium L.</i>	Banokr a,bichh	Asteraceae	Root, Seeds	Alkaloids,Flavnoids,Tanins,sap onins,Glycosides,Coumarins .	Decoction of the root and seed

117.	<i>Xeromphis spinosa</i> (Thunb.)Keay	u-butti Kharhar, Mada n	Rubiaceae	Stem, Bark, Fruit	Cardiac glycosides,Flavonoids,Glycosides,phenols,Reducing sugars,Saponins,Steroids,Tanin, Triterpenes	Decoction and paste of stem bark ,fruit pulp
118.	<i>Zephyranthes candida</i> (Lindl.) Herb	White rain lily	Amaryllidaceae	Leaves, Flower	alkaloids, ceramides, phospholipids, sterols, fatty acids, flavonoids and their glycosides.	Decoction of leaves and paste of little flowers
119.	<i>Zingiber officinale</i> L	Adi/ad rak	Zingiberaceae	Rhizome	Dehydrogingerol,gingerol,tetrahydrocurcumin, and hexahydrocurcumin.	The fresh juice of the rhizome is mixed with honey .

Fig. No. 1.



Abrus precatorius



Abutilon indicum



Aegle marmelos



Ocimum americanum



Acacia nilotica



Achypha indica



Curcuma longa



Nelumbo nucifera



Achyranthus aspera



Adina cordifolia



Argemone maxicana



Aristolochia bracteolata



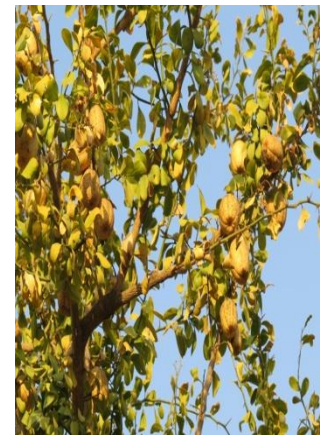
Ailanthus excelsa



Andrographis paniculata



Bacopa monnieri



Balanites aegyptica



Anisomeles malabarica



Anogeissus latifolia



Bambusa arundinaceae



Bauhinia recemosa



Boerhavia diffusa



Boerhavia erecta



Careya arborea



Celosia argentea



Butea monosperma



Boswellia serata



Chrysanthemum indicum



Cissampelos periera



Caesalpinia crista



Calotropis gigantea



Clorodendrum serratum



Clitoria tementa



Cordia dichotoma



Cyprus rotundus



Dioscorea bulbifera



Diospyros melanoxylon



Cryptolepis buchananii



Curcuma pseudomontata



Eclipta alba



Elephantopus scaber



Datura metel



Desmodium gangeticum



Evolvulus alstonia



Ficus hispida



Ficus recemosa



Gloriosa superba



Hibiscus rosa-sinesis



Holarrhena antidysenterica



Glycyrrhiza glabra



Gymnema sylvestre



Ipomea quamoclit



Lagenaria siceraria



Helicteres isora



Hemidesmus indica



Lagerstroemia indica



Lawsonia inermis



Leptadenia reticulata



Leucas aspera



Nyctanthus-arbor-tristis



Panax ginseng



Melia azedarach



Madhuca longifolia



Picrohiza kurroa



Plantago asiatica



Meyna laxifolia



Morus alba



Pterocarpus marsupium



Randia dumetorum



Smilax zeylanica



Solanum virginianum



Tinospora cordifolia



Opuntia elatior



Spilanthes calva



Sterculia urens



Tribulus terrestris



Urginea indica



Thalictrum foliolosum



Terminalia bellirica



Vernonia ceneria



Vitex negundo



Wattakaka volubilis



Withania somnifera



Xeromphis spinosa



Eryngium foetidum



Zephyranthes candida



Woodfordia fruticosa



Wrightia tomentosa



Xanthium strumarium

IV. DISCUSSION

Medicinal plants used in communities are not only vital as an essential part of the traditional system of local folks but might also play a significant role as source of therapeutic drugs in the future (22). It is said that interest in medicinal plants is increasing as an alternative modern medicine so there is an urgent need for conservation of this treasure. This study has identified a number of important medicinal plants used by the traditional healers of Jharkhand state for the treatment of antiviral, antibacterial and immunomodulators. This helps in preventing cough, cold and flu in context to Covid 19. It provides a base line for future phytochemical and pharmacological investigations into the beneficial medicinal properties of such plants.

Instead of relying on trial and error occasioned by random screening procedure, properly documented traditional knowledge could help scientist to target those plants whose medicinal properties may find new application for the benefit of all mankind (23). However the further efforts should be made to start in depth to understand the medicinal uses for pharmaceutical research which will bring for pharmaceutical research which will bring new treatment for a promising cure for the global panic.

V. ACKNOWLEDGEMENT

We express our humble gratitude to Dr. O.P. Rathor, Former P. G. Head, Science College, Nanded, Maharashtra for his kind help and support.

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