Phytotherapy and Prophylaxis of SARS-COV by Locally Available Plants

Dr. Duneshwar Meshram
Professor, Govt. Bilasa Girls Pg College Bilaspur, Chhattisgarh, India

Abstract **- The Corona virus belongs to the family Coronaviridae which spread anthropogenic disease across the world and created havoc beyond the stunning circumstances. Mass of the people extremely scared of resurgence of the threatening disease and hospitalised without any specific alleviating and ameliorating medicinal management. Millions of people died and beleaguered from their families under the unimaginable stampede and unmanageable situations. The WHO and other medical organisations prioritized oxygen and alleviation in fever, vomit, diarrhoea and extreme debility due to loss of protein which ultimately resulted into catastrophe. Various symptoms controlling medicines and nutraceuticals had to apply to ameliorate conditions of the patients which almost created perplexity to treating patients in saving their precious lives. Exacerbation of infection created unmanageable situations under ARDS and Cytokine Storm due to lack of strategies at the molecular level of potential therapeutic drugs to neutralise and destroy viral proteins. Many chronic- disease bearing people died earlier along with those did not get adequate facilities immediately. Successful trials of therapeutic drugs and their favourable results brought controllable findings but somewhere lack of full-proof scrupulousness of strategies are still unmanageable and unconvinced under extreme threat of anthropogenic variants. Ayurveda and the local plants as armamentarium can effectively contribute to recuperate and convalesce patients from pre to post covid-19. Various symptoms of disease are curable by utilizing local plant species of potential significance to restrict and inhibit initial infection and exacerbation. This research paper represents strategical activities of phytochemicals against Covid-19 symptoms. The plant part-based phytochemicals are most considerable strategical weapons against covid-19.**

INTRODUCTION

Bilaspur is located on the Howrah Kolkata route introduces as the second largest city of Chhattisgarh and known for coal mines and power generation rich NTPC Seepat. The bigger South- East Central Railway Zone a regional hub of India, the high court, SECL headquarter, Apollo hospital, The Guru Ghasidas Central University, a small airport, education and commercial hub are the attractive sites of Bilaspur district. Bilaspur was named after a fisherwoman Bilasa and dates back to more than 400 years. Paddy and Kosa silk sarees, kurta, aromatic dubraj rice among various qualities of rice, many temples, Achanakmar sanctuary are fascinating features. Bilaspur is notably famous for different cultures and festivals including colourful Raut dance and Pola, Diwali, Holi. Bilaspur is densely populated by 750000 lakh people asper 2011 census. Bilaspur comprises an average literacy rate 91.29pc and people speak Hindi, Chhattisgarhi, English languages and include Bengali and South Indian cultures too.

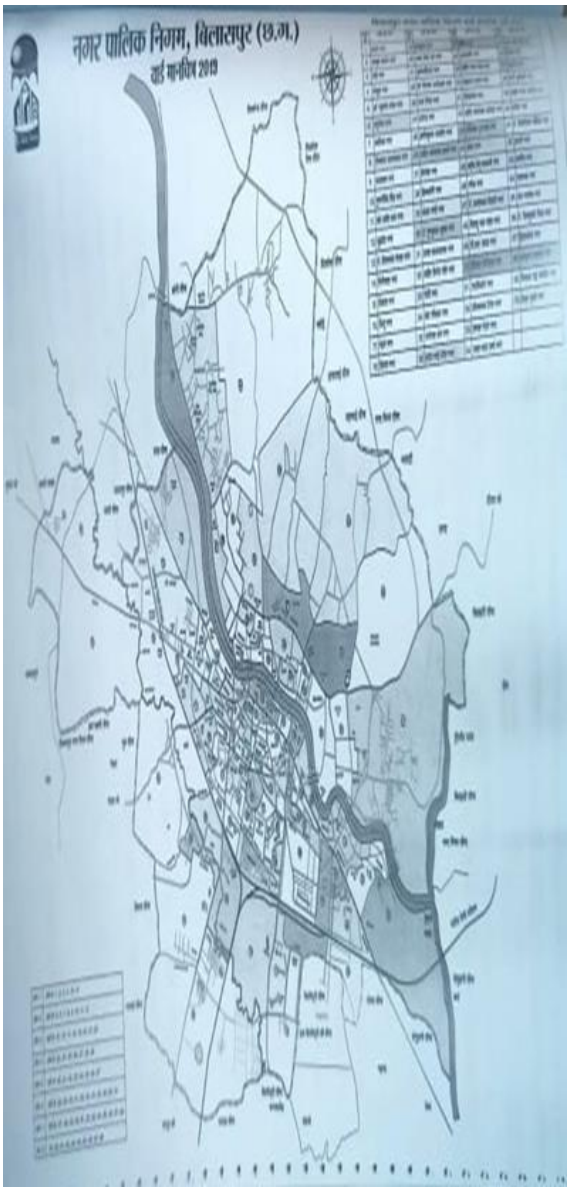
Vegetation of Bilaspur exhibits valuable and significant which introduces to various varieties of plant species of multifarious benefits for multiple diseases.

Covid-19 disease related local plant species are abundantly found in city and outskirt of Bilaspur which ensure to combat against Covid-19 and variants by excellent prophylactic phytochemicals of different plant parts are considerable for successive analytical assessment for humanitarian values at the cheapest level to ameliorate and rejuvenate patients. Bilaspur represented 320 Covid-19 cases lower than Raipur1156 and Durg 911 as updated on Jan 26 ;2022. Bilaspur, Raipur, Durg recorded positive rate 0.32% updated on Jan 8; 2022.Vaccination drive above 70% has also secured population of Bilaspur district. Covid-19 cases have abruptly mitigated resurgence and disappeared in Bilaspur due to stronger social, healthy dietary culture including medicinal green vegetables, lower aerosol pollution, back-breaking routine, hygienic environ and higher literacy rate apart from protocol. Bilaspur represented very low mortality rate and speedier recovery rate.

GEOGRAPHY AND CLIMATE

Bilaspur [CG] is located at between 21.47 degree and 23.8 degree North latitudes and 81.14 degree and 83.15 degree East longitudes and the total area has stretched to 6377 km.2 The hot summer with maximum 44-45dc but the highest temperature was recorded 47.4 degree in 2013 and 49.3 degree in 2017. Cool winter with 8-30 dc and short rainy season with around 58 cm exhibit climatological conditions in Bilaspur. The lifeline river Arpa fulfils needs of water and sand for Bilaspurians. The climate of Bilaspur is sub-tropical, semi- arid, continental and monsoon type.

MAP



Medicinal plants of Bilaspur are utilized for multiple purposes to treat and cure diseases. Different plant parts exhibit effective prophylaxis against ailments to utilize and consume by different methods like decoction, extract, paste, powder and raw materials. Plant species of various families exhibit ameliorating and curing ailments by phytochemical properties. The biological activities are observed regulated and controlled by ameliorating physiological disturbances and causes in the body. Each plant represents significant chemical properties to alleviate and improve symptoms by the utilization of single part and armamentarium.

Table 1-Plants exhibiting phytochemical and biological activities are represented below:

S. N.	*Plant*	*Family*	*Local name*	*Plant part*	*Phytochemical*	*Biological activity/Disease*
01	Allium sativum	Alliaceae	*Garlic* Lahsun	Bulb	Multivitamins, amino acids, flavonoids, quercetin, organo-sulphur compounds, polyphenols, S-allyl-cysteine, diallyl-disulphide, diallyl-sulphide, N-acetylcysteine, vinyl dithiin, aliin [S-allyl-L-cysteine] L- aliin, ajoene, E-ajoene, Z-ajoene allicin, garlic thiosulphate, terpenes, sesquiterpenes, glycosides, alkaloids, saponins, steroids, tannins,	Antioxidant, antibiotic, anticovid-19, antiviral, antimicrobial, free radical scavenger, fever, sore throat, immunomodulator, antimutagenic, nephroprotective, diuretic, antiapoptotic, bronchitis, antiasthmatic, detoxificant, antiglycemic, antithrombotic, neuroprotective, aphrodisiac, cardioprotective, antiarthritic, anticholesterolemic, antidepressant, hepatoprotective, Anticarcinogenic, antiinflammatory, antirheumatoid,
02	Allium cepa	Alliaceae	Onion, Pyaj	Bulb	Polyphenols, flavonoids, quercetin, quercetin 3-glycosides, kaemferol, gallic acid, protocatechuic acid, isorhamnetin 3, 40-diglucoside, diphenylamine, multivitamins, flavonoids, saponins, phytosterols, amino acids, organosulphur, S-allylcysteine, quercetin-4-0- β glucoside, S-methylcysteine, S-allylcysteine sulfoxide, diphenylamine, S-propylcysteine, S-ethylcysteine, S-allylmercaptocysteine, S-alkyl- L-cysteine sulfoxides, S-propyl-L cysteine, anthocyanins,	Anticovid-19, antiviral, antimicrobial, free radical scavenger, antiasthmatic, immunomodulator, fever antibiotic, antidepressant, detoxificant, antithrombotic [antiplatelet, anticoagulant], bronchitis, bronchodilator, antihypercholesterolemic, antioxidant, antiarthritic, antiapoptotic, anticarcinogenic, aphrodisiac, Cardioprotective, anti-inflammatory, rejuvenator,hepatoprotective, antihyperglycemic, neuroprotective
03	Azadirachta indica	Meliaceae	Neem	Leaf, bark, Flower	Deacetylgedunin, epoxyazadiradione, nimbin, nimbidin, triterpenoids, glycosides tetranorterpenoids Azadirachtin, fraxinellone aminoacids, margosine, flavonoids, nimbosterol, melicitrin, carbohydrates, kaempferol, dihydroeugenol,	Antioxidant, free radical scavengers, anticovid-19, anti-inflammatory, antibiotic, hepatoprotective, antimalarial, fever cardioprotective antihyperglycemic,antiasthmatic, antiulcerative, bronchitis, anticarcinogenic, antiapoptotic, antiinfective, antiviral
04	Amorphophallus titanium A.campanulatus	Araceae	Yam	Tuber	Protein, starch, carbohydrate, flavonoid, saponin, phenols, alkaloid, steroid, fat, amylase, betulinic acid, tricontane, lupeolstigmasterol, β-sitosterol, palmitate, glucose, galactose, rhamnose, xylose	Anticovid-19, free radical scavengers, immunomodulatory, antiarthritic, antioxidant, pile fistula, acute rheumatism, abdominal tumor, hepatoprotective, anti-infective, gastrointestinal ulcerogenic, anti-inflammatory, aphrodisiac, bronchitis, asthma, general debility, liver, rejuvenator
05	Adhatoda vasica	Acanthaceae	Adusa, Vasaca	Leaf, root,	Anisotine, vasicoline, vasicine, vasicinol, vasicinone, carotene,	Anti-covid-19, hypoxia-hyperinflammation antioxidant,

				bark, WP	phenols, tannins, alkaloids, adhatinine, anthraquinone, saponins, flavonoids, reducing sugar, terpenes, glucosides, β-sitosterol-D glucoside, kaempferol, pegamine	asthma, sore throat, bronchitis, free radical scavenger bronchodilator, anti-inflammatory, arthritic, antidiarrheal, bleeding pile rheumatism
06	Aegle marmelos	Rutaceae	Bael Golden apple	Fruit, leaf, bark, root	Multivitamins, vit C, carotenoids, terpenoids, flavonoids, alkaloids, coumarins, mermesinin, rutin, phenylethyl cinnamides , aegeline, ,aegelinosides, phenyl proponoids, marmelin,psoralen,xanthotoxin,tembamide,mermin,skimminanine,xanthotoxol,imperatorin, alloimperatorin, β-sitosterol,	Anticovid-19, lower bronchial infection, IBS, hepatoprotective, antiglycemic, cardioprotective, antioxidant, free radical scavenger radioprotective, immunomodulatory, anti-inflammatory, antirheumatic, antiarthritic, antiepileptic [anticonvulsant], antidiarrheal, anticolitic, antiulcerative, anticholesterolemic, antiinfective, cytotoxic, antithrombotic, antiplatelet/antifibrotic, rejuvenator, anticarcinogenic
07	Agaricus bisporus	Agaricaceae	Mushroom	Gill cap	Minerals, vitamins, polyphenols, terpenoids, alkaloids, polymers, sesquiterpenes, glycoproteins, polysaccharides, lectins, proteins, flavonoids, lactones, sterols, ergosterol, glycogen, mannitol, fats, volatile oils, enzymes, β- glucan, ascorbic acids, organic acids, trehalose, fructose, glucose, mannose, amino acids, tocopherols, linoleic acid, ergothioneine, glutathione, δ- aminobutyric acid,	Anticovid-19, Free radical scavenger, antioxidant, respiratory syndrome, antipneumonic, antiasthmatic, bronchitis, antithrombotic, antiplatelet, anticoagulant, sore throat, immunomodulatory, rejuvenator, antiglycemic, anticholesterolemic, anticarcinogenic, antiinfluenza, antiapoptotic, Alzheimer, Parkinsonia, radiotherapeutic, chemotherapeutic, hepatoprotective, liverprotective, brain booster, antinflammatory, antiosteoarthritic, anticytotoxic, cardioprotective, detoxificant, antiinfective, antitumor, antiarthritic,
08	Andrographis paniculata	Acanthaceae	Chiretta Kalmegh Kariyatu	Leaf, WP	Andrographolide, dihydroxydimethoxyflavone, diterpenoid, neoandrographolide, xanthones, polyphenols, flavonoids, arabinogalactan, dehydroandrographolide, chlorogenic acid, cinnamic acid	Anticovid-19, antioxidant, antibiotic, free radical scavenger anti-inflammatorry, jaundice, fever, malaria, anti-infective, cardioprotective, antiglycemic, hepatorenal-protective, hepatoprotective, liverprotective, antidote/ snakebite, antiinfluenza, antidiarrheal, bronchitis, sore throat, antiulcer, anticarcinogenic, antiapoptotic,
09	Citrus medica	Rutaceae	Nimboo	Fruit, leaf, bark	Multivitamins, thiamine, riboflavin, niacin, flavonoids[hesperidin], vit C, alkaloids, carotenoids, terpenoids limonoids, coumarins, flavones, flavonoids, flavonones, glycosides	Anticovid-19, antioxidant, free radical scavenger, pneumonia, anti- inflammatory, Alzeimers, Parkinsons, brain booster, anticarcinogenic, antimutagenic,

					[C-glycosides, O-glycosides, neohesperidosides], phenolic acids, aglycones [naringenin, naringin quercetin, hesperetin, kaempferol], essential oils, psyllium, tannin, folic acid, monoterpenes,	antiapoptotic, neuroprotective, cardioprotective, hepatoprotective, BIS antidiarreal, anti-inflammatory, antidiabesity, anticholesterolemic, antiglycemic, DNA repairing immunomodulatory
10	Catharanthus roseous	Apocynaceae	Sadabahar	Root, leaf, flower	Ceparanthine, catharanthine, vindoline, rubacine, vinblastine, chlorotabersonine, vincristine ajmalicine, serpentine, reserpine, leurosine,	Anti-covid-19, free radical scavenger, antioxidant, sore throat, mouth ulcer, antiasthmatic, anticholesterolemic, antidiarrheal, hepatoprotective antiglycemic, cardioprotective, anticarcinogenic, antiapoptotic
11	Clitoria ternatea	Fabaceae	Butterfly-Namjai Aparajita	Flower, leaf	Protein, carbohydrate, alkaloids, terpenoids, flavonoids, steroids, saponins, resins, tannins, ternatins, taraxerol, taraxerone, quercetin, kaempferol, myricetin, β-Sitosterol, malvidin, catechin EGCG, 3β-Glucoside, delphinidin-3, p-hydroxycinnamic acid, ethyl-a- D galactopyrenoside, anthoxanthin glucoside,	Anticovid-19, antioxidant, immunomodulatory, free radical scavenger, antimutagenic, anti-inflammatory, bronchitis, antiglycemic, antipneumonic, diuretic, aphrodisiac, hepatoprotective, neuroprotective, rheumatoid arthritis, anticarcinogenic, antiapoptotic, antidiarrheal, anti-infective, laxative, cardioprotective, antistress, liverprotective, nephroprotective, rejuvenator, brain booster, sore throat, bronchodilator, antiasthmatic, antihyperlipidemic, anti-pulmonary inflammation,
12	Cassia allata/ Senna alata	Fabaceae	Candle plant, Candle tree	Leaf Flower Seed Bark	Flavonoids, terpenoids, anthraquinone, tannins, saponins, phenolics, cannabinoid alkaloids, 1.8- cineole, β caryophyllene, limonene, α-selinene, germacrene-D, cinnamic acid, quinones, pyrazol-5-ol, methaqualone, isoquinoline, steroids, ascorbic acid, tocopherol, carotene, quercetin, quercitrin emodin, astragalin, kaempferol, kaempferol 3-0-gentiobioside	Anticovid -19, free radical scavenger, antioxidant, antiviral, cardioprotective, bronchitis, antiasthmatic, antiglycemic, antihyperlipidemic, antimalarial, fever, anticarcinogenic, antiinfective, immunomodulatory, laxative, antidiarrheal, fistula, hepatoprotective, nephroprotective,
13	Chlorophytum borivillianum	Asparagaceae	White musli	Root	Triterpenoids, Saponin, sapogenin, histamine, prostaglandins, steroids, alkaloids, phenols, carbohydrate, protein, glycosides, stigmasterol, β-sitosterol, hecogenin, polysaccharides, fructans	Anti-covid-19, immunomodulator, antioxidant, antiglycemic, aphrodisiac, antiplatelet, anti-inflammatory, debility, Anticholesterolemic,
14	Curcuma longa	Zingiberaceae	Turmeric Haldi	Rhizome Leaf	Curcumin, curcuminoid, campesterol, sitosterol, phenolic, diketone, sesquiphellandrene, cineole, ar-turmerone, demethoxycurcumin,	Anticovid-19, fever, anti-inflammatory, bronchitis, free radical scavenger, cardioprotective, antiapoptotic, anti-infective, Alzheimers disease, brain booster, antioxidant,

					bisdemethoxycurcumin, L-betacurcumene	antifibrotic, hepatoprotective, antiarthritic, osteoarthritic, antitumor anticarcinogenic, sore throat
15	Cymbopogon citratus	Poaceae	Lemon gra-ss	Leaf	Citral, geranyl acetate, terpiniol geraniol, terpinolene, myrecene neral, cymbopogone, cymbopogonol triterpenoids, flavones, leutiolin, 6-C glucoside, citral-a, citral-b, citronellal, nerol, methylheptenone, carotenoids, alkaloids, lignins, tannins, flavonoids, polyphenols, steroids, cardioprotective, antiinfective, chlorogenic acid, isoorientin, swertiajaponin,	Anticovid-19, antioxidant, antibiotic, anti-inflammatory, antipneumonic, antioxidant, antistress, bronchitis, fever, brochodialatory, antiasthmatic, immunomodulatory, detoxificant, hepatoprotective, neuroprotective, anticolitic, sore-throat,bronchitis, antiarthritic, antirheumatoid, bodyache, anticarcinogenic. Antiapoptotic
16	Eucalyptus tereticornis	Myrtaceae	Gum tree Stringy bark tree	Leaf	Sesquiterpenes, monoterpenes, α-pinene, globulol, α-terpineol, spathulenol, viridiflorol, pinacarvone	Anti-covid-19, anti-inflammatory, antiasthmatic, bronchitis, antiarthritic, antioxidant, sore throat
17	Emblica 0fficinalis	Euphorbiaceae	Amla Gooseberry	Fruit	Amino acids, ascorbic acid, tannin, flavonoids, proteins, nutraceuticals, carbohydrates, amblicanin, phyllaemblicin, punigluconoin, tannin, multiwitaminous, phyllantine, quercetin, kaempferol, citric acid, gallic acid, ellagic acid, chebulinic acid, chebulagic acid, corilagin, luteolin, geraniin, isocorilagin,	Anti-covid-19, immunomodulator, antioxidant, jaundice, brain booster, antiulcerative, osteoarthritis, ophthalmopathy, hepatoprotective, anti-inflammatory, free radical scavenger, apoptotic anticholesterolemic, antiglycemic, aphrodisiac, cardioprotective, antidiarrheal, neuroprotective, antiapoptotic, anticarcinogenic, rejuvenator
18	Eugenia jambolana/Syzygium cumini ***	Myrtaceae	Jamun Black plum	Fruit, leaf Root Bark Seed	Multivitamins, phenolic acid gallic acid, ellagic acid, caffeic acid, ferulic acid, resorcinol, glucoside, jamboline, jambosine, corilaginin, monoterpenoids, β-pinene, terpinene, barbeneol, β-phellandrene, flavonoids, rutin, quercetin, isoquercetin, quercetic 11, β-sitosterol, anthocyanins, delphinidin, petunidin, malvidin diglucosides, kaempferol, tricontanol, friedelin, eucarvone, betulinic acid, pinocarvone, oleanolic acid, gallotannin, essential oils,	Anticovid-19, free radical scavenger, antioxidant, antidiarrheal, antiviral, pile, fever, cardioprotective, virucidal, anti-inflammatory, urinary, rejuvenator, immunomodulatory, antiasthmatic, bronchitis, antiinfluenza, antipneumonic, antiulcerogenic, hepatoprotective, antihyperglycemic

Figure 1&2:The graphical view in histogram represents leaves are commonly utilized and they depicted 12 at the highest level to alleviate and ameliorate disease symptoms. The bark, root, fruit and flower in their orders prove their significance to inhibit and restrict viral activities. Consumption of plant parts in different modes signifies effective prophylactic roles against pre and post Covid-19 symptoms by

inhibition and restriction to the viral growth and regular consumption leads decisive and crucial results. Phytochemical based studies justify natural products need prime focus on their utilization signifying molecular properties against amplification and mutagenic activities of Corona virus and variants. These plant parts have pragmatically proved potential significance to virological and physiological changes to recover from symptoms. The graphed visualization signifies greater degree of prophylaxis and focuses successive assessment at the molecular level of natural products against anthropogenic disease.

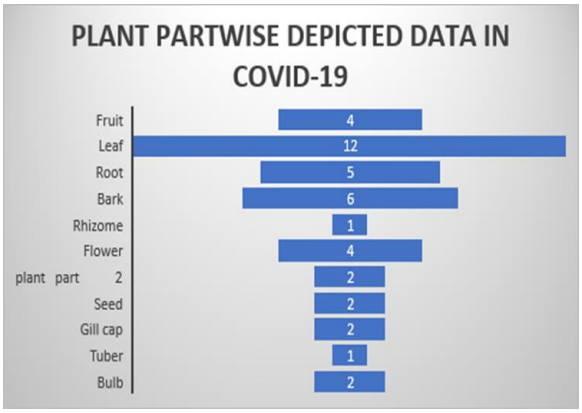


Fig. 1 Depiction of utilized plant parts against Covid-19

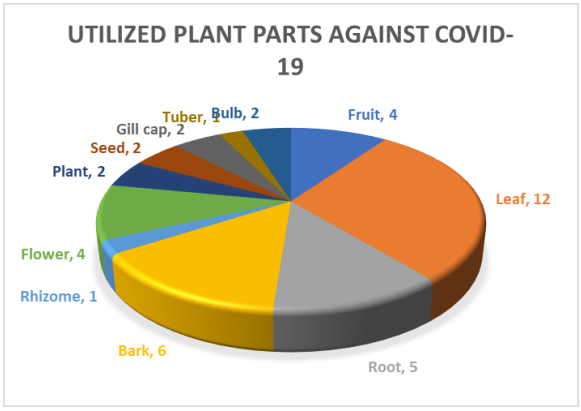


Fig. 2 – Depiction of datawise utilized plant parts

Figure 3:The graphical representation and visualization have depicted familywise data. Five families Alliaceae, Fabaceae, Rutaceae, Acanthaceae, and Myrtaceae have represented the largest potential contribution and effective utility to visualise valuable molecular assessment as armamentarium, adjuvant drugs and their novel findings for the cheaper futuristic therapeutic drugs to inhibit pathways of protein synthesis and replication of the viral particles.

Other families also represented similar significance to visualize their decisive and vital contributions to restrict and inhibit synthesis and replication of the virus. All the thirteen families [13] represent their potential contributions to alleviate and ameliorate virological and physiological symptoms against anthropogenic disease. The graphed visualisation imperatively needs focus to conserve and preserve more prophylactic significant plant species and families. Availability and credibility of these families provide easy accessibility to the common people are the prime focus of this research to cure them without hospitalization. Phylogenetical molecular analyses are indispensable to track mutagenic changes may certainly lead to explore novel drugs cheaper at cost to facilitate to the common people to recuperate and convalesce them.

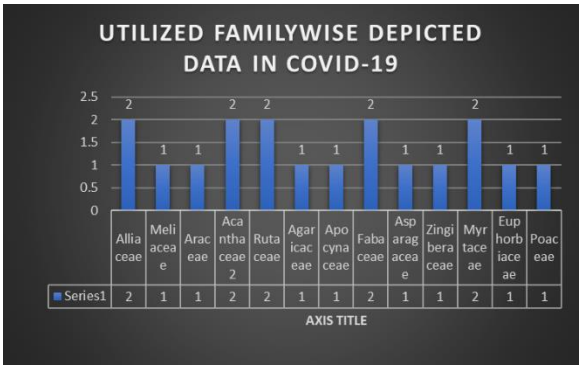


Fig.3 – Depiction of collected families against Covid-19

Figure 4: The graphical data in histogram represent various biological activities and visualization of epidemiological analyses and assessment of symptomatic disease. The phytochemicals have potentially contributed their molecular activities in suppressing and inhibiting the viral protein synthesis and replication and have drastically reduced amplification and exacerbation.

All the plant species have shared 100% against Covid-19 by representing prophylactic properties. Antioxidant, free radical scavenger and anti-inflammatory properties signify highest value of inhibitory and deteriorating pathways of proteins and replication of the virus. Hepatoprotective properties manage and repair digestion, glucose level and liver whereas bronchitis, anti-asthmatic, anti-pneumonic properties protect from respiratory and inflammatory complications. Antiinfluenza, anticarcinogenic, and apoptotic properties exhibit reduction and suppression

in viral offence and growth. Bronchodilatory property helps against oxygen stress. Extracts of the selected plant parts keep on prophylaxis in arthritis, cholesterolemia, hyperlipidemia, diarrhoea, fever and vomiting. Other biological activities are found significant in managing nephrological, diuretic symptoms. Few plants exhibit antimutagenic activities to restrict genomic modifications may be a greater explorable link to break down replicable chains.

Plants of rejuvenating properties maintain debility during illness and ameliorate ill-health. Detoxificants detoxify harmful toxins of the virus which induce sepsis and other deteriorating effects in blood and tissues. High fever is suppressed by specific plant parts to avert critical stage of cytokine storm and correlated symptoms. The correlated symptoms of diarrhoea and vomiting are alleviated along with improvement in fever and bronchitis. Cardioprotective, antiarrhythmic and antiglycemic properties of the phytochemicals inhibit viral activities and ameliorate blood pressure, arrhythmia, vertigo, liver and nephrological symptoms. Antithrombotic properties of plants including anticoagulant and antiplatelet inhibit fatalistic viral growth in brain, heart and lungs and pull out of jeopardising conditions. Plants bear aphrodisiac properties which is considerable in all kinds of patients. The damaged gastrointestinal system is recoverable by consumption of significant plants. Several plants rejuvenate and activate various organs to revive their proper biochemical cycles and pathways to convalesce from pre and post covid-19 effectivity.

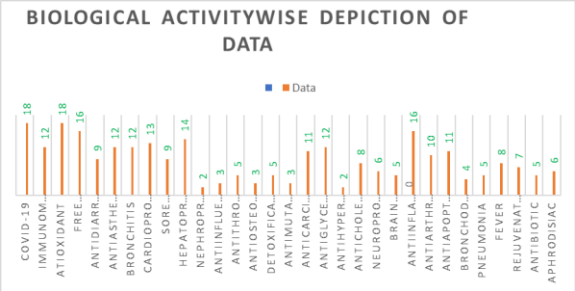


Fig. 4 Epidemiological study and biological activities-based data

Minerally rich and multivitaminous plant parts with intermittent water fulfil immediate shortage and save from sepsis, convulsion, vertigo and other collapsing systems.

CONCLUSION

Increased amplification of the viral infection exhibits deteriorating condition and may lead to sepsis, debility and cytokine storm which further creates to ARDS(Acute Respiratory Distress Syndrome)and pneumonic symptoms as fatalistic stages.

Infection at the early stage is suggestive to utilize selected armamentarium to reduce and alleviate panic symptoms. Faster recovery depends on consumption of alternatively selected armamentarium which effectively reduces temperature and improves oxygen level reciprocally. Acute debility leads to arthritis, osteoporosis, loss of fertility, memory loss, dementia, arrhythmia, low dietary, low body mass index and neurological ailments.

The presented research paper suggests greater prophylactic significance of the natural plant products to curb crisis of such anthropogenic disease.

The research is suggestive to analytically assess molecular activities and pathways against the viral growth. The research suggests assessment of phylogenetic genomic modifications of the viruses to explore more efficacious therapeutic drugs.

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