

## A Short Review on Phytomedicines

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### ABSTRACT:

The article has been discussing the plants and various methods of preparing medicines to obtain phytomedicines as an alternative approach to treat the Covid19 pandemic. The findings of the review article showcase that the “*Withania somnifera* (Ashawagandha)” which is effective for reducing stress, “*Tinospora cordifolia*” which is effective for preventing fever, skin diseases and others, “*Curcuma caesia* Roxb” which is effective for preventing asthma, bronchitis and others. In case the effectiveness of the plants has been identified then it becomes easy to make and experiment with those plants and prepare the medicine for the welfare of the people. “*Anacardiaceae*”, “*Lamiaceae*”, “*Asteraceae*” and others are some botanical family of plants which also provides concrete results in the form of phytomedicines. Covid19 has been an international concern which needs to be resolved through considering different treatments.

**Keywords:** Covid19, Phytomedicine, Aakashmoni, flavonoids, mother tincture

### INTRODUCTION:

Covid19 has evolved as a pandemic at the end of 2019 in Wuhan, China and was subsequently declared a “Public Health Emergency of International Concern” (PHEIC) in January 2020 by the World Health Organisation (WHO). Covid19 has been the sixth PHEIC after the detection of the Ebola virus in West Africa, polio, Zika virus in East-Central Africa and others in different parts of the world (Sohail *et al.* 2021). Covid19 has been formerly called “severe acute respiratory syndrome coronavirus 2” (SARS-CoV-2) by the respective “International Committee on Taxonomy of Viruses”. As per the WHO report, it has been found that SARS-CoV-2 has been detected in certain samples that have been eventually collected from the “Huanan Seafood Market in China”. SARS-CoV-2 has been novel and has been transferred from animals to different human beings. There have been bats and live animals present in “Huanan Seafood Market and findings” that have been based on genome analysis which have further strengthened this specific idea that coronavirus has been transmitted from bat droppings in the form of contamination.

SARS-CoV-2 has been described as a “*chimeric virus*” found between some bats and unknown origin. There has been a period, especially the emergence of the pandemic in early 2020 when biomedical researchers have struggled to figure out treatments and also drugs to save the lives of people. The tracker of Coronavirus has shown the performances and experiments conducted through some antibodies and drugs as follows:

**New additions and recent updates**

Aug. 6	An N.I.H. study showed that <b>lenzilumab</b> performed no better than a placebo.
July 8	Added the anti-cancer drug <b>sabizabulin</b> .
May 10	The F.D.A. approves <b>baricitinib</b> for people with advanced Covid-19.
April 5	The F.D.A. no longer authorizes the antibody drug <b>sotrovimab</b> .

Figure 1: Experimentation through antibodies and drugs

(Source: Zimmer et al. 2022)

The above table reviews the failure and possibilities of the performances of an antibody that is “*Lenzilumab*” that has not performed more than a placebo (substance with no pharmacological effect). The results after patients are provided with “*Lenzilumab*” have shown that survival rates of Covid19 patients have improved without the assistance of mechanical ventilation (Temesgen *et al.* 2022). “*Sabizabulin*” is another chemical compound (drug) that is *orally bioavailable* and can bind the “*colchicine binding site*” associated with *alpha* as well as *beta-tubulin*. This drug disrupts microtubules (components within the cytoskeleton) which have been a central mechanism contributing towards antiviral as well as anti-inflammatory activities (Zimmer *et al.* 2020). It has been witnessed that these drugs usually attack (target) microtubules possessing antiviral activities by causing a disruption of intracellular transport associated with the virus which includes SARS CoV-2 and also microtubules. This drug has also been found to be lethal for the respiratory impacts of the chosen virus. Thus, there are certainly valid reasons to discard this drug of anti-cancer.

“*Dexamethasone*” along with “*tocilizumab*” is two drugs that have failed to show results to enhance the condition of coronavirus. It has been seen that both these drugs cause a reduction in mortality rates of patients suffering from Covid19. These drugs are utilised for curing rheumatoid arthritis. However, “*Baricitinib*” possesses “*anti-inflammatory* as well as *anti-viral*” properties. This drug can curb mortality rates by around 28 days albeit for patients in the advanced stage of the virus (Selvaraj *et al.* 2022). Therefore, this drug is again not capable to fetch results for patients suffering from grave symptoms of the virus. “*Sotrovimab*” is another antibody drug that has been denied for treating patients with mild or moderate conditions of Covid19. Therefore, covid19 has been such a pandemic that has struggled with a deficiency of medicines for a long time.

**MATERIALS AND METHODS:**

Phytomedicine refers to the utilisation of various medicinal plants that possess the capability to either prevent or treat Covid19. It has ensured quality, efficacy and safety and has majorly contributed to WHO which possesses priority to ensure that every people have access towards quality healthcare. There are over 80% of the world's population has been seen to be

using phytomedicines (Ngwa *et al.* 2020). However, there is some anecdotal evidence that has been seen to be limited through poor bioavailability.

### Selection of medicinal plants



Figure 2: Apiaceae

(Source: Brahmi *et al.* 2022)

*Bejaia* (a Mediterranean port city in Algeria) is a temperate zone possessing a moderate Mediterranean climate. The *ethnobotanical survey* (study of humans and plants) has been carried out between 1st February to 31st May 2021 and this survey has been witnessed to be conducted in various regions within Bejaia. There have been right regions that have been selected in Bejaia from where data has been collected on some medicinal plants both in terms of vernacular as well as Latin names along with information related to the preparation method, treatment duration, side effects and others (Brahmi *et al.* 2022). There has been a total of around 23 medicinal plants have been selected that belong to 12 of the botanical families for the prevention and also treatment of the selected disease.

### Preparation



Figure 3: Anacardiaceae

(Source: Pachi *et al.* 2020)

The preparation method revolves around administering bioactive substances within herbal medicine. The habitats from this chosen port city involve infusion, decoction, cooking, rawness, powdering and others. The medicinal plants that have been selected for carrying out the experiment and testing whether phytomedicine will be applicable and effective for curing Covid19 or not are “*Apiaceae*”, “*Anacardiaceae*”, “*Pinaceae*”, “*Olaceae*”, “*Lauraceae*”, “*Asteraceae*”, “*Amaryllidaceae*”, “*Lamiaceae*”, and others (Brahmi *et al.* 2022). In this aspect, both infusion and decoction have been illustrated as the most useful preparation methods in this region. Infusion refers to an essential method of providing fluids that also includes drugs within the bloodstream. Conversely, decoction points out mashing followed by boiling in a liquid such as water to extract the oil, chemical substances and others from those chosen medicinal plants. The population of this region states that they have a preference for fresh herbs which eventually get dried up and then that dried part has been considered for the cure elaboration.

#### *Acacia auriculiformis* A. Cunn



Figure 4: Earleaf Acacia

(Source: Datta, 2020)

*Biomedicine- Acaciasides (A&B)* has been successful to overcome the challenges related to medical complications. It can treat grave ailments where it has witnessed a decrease in toxicity, an increase in efficacy and also the presence of bioactive phytoconstituents within A&B. The earlier experiments that have been conducted on "*Acaciasides or Acacia auriculiformis-extract*" and also on "*Aakashmoni*" have been prepared from the fruits of "*Acacia auriculiformis* A. Cunn" (*earleaf acacia*) have been effective to treat diseases such as "*root-knot*", "*powdery mildew*" and also Covid19 (Datta, 2020). "*Acacia auriculiformis* A. Cunn" is a fast-growing tree belonging to the Fabaceae family of plants. *Biomedicine-Acaciasides in the form of phytomedicine* may be capable to treat Covid19 by boosting the immune system of the Covid19 patients. However, there are no clinical trials to prove the use of this specific plant. In this aspect, it is important to state that "*Withania somnifera* (*Ashawagandha*)" is an effective Ayurvedic medicine that is capable of reducing stress and anxiety which are the major mental health issues among people during the pandemic crisis.

## Preparation



Figure 5: Funicles of “Acacia auriculiformis A. Cunn”

(Source: Datta, 2020)

The *air-dried*, as well as *powdered fruits* or some *funicles* of the selected plant, have been extracted with the help of *90% ethanol* at a room temperature of around  $25 \pm 2^\circ\text{C}$  for *15 days* and have been filtered for collecting the extract (Datta, 2020). The ethanol is removed from the respective extract through evaporation followed by drying of the residue within the *desiccator* (sealable enclosures). The crude residue has been seen to have dissolved in that *90% ethanol at the 1 mg/ml concentration*, which eventually helped in the formation of the chosen homoeopathic medicine.

The potentials of “*Withania somnifera* (Ashawagandha)”, “*Tinospora cordifolia*” and “*Curcuma caesia*” has been tested and it is identified that using these plants and Ayurvedic medicines are helpful to improve psychical and mental health of people during the COVID-19 pandemic crisis. The potential of Akashmoni in liquid form has also been tested where it has been evaluated that Aakashmoni MT has been diluted with around 90% of ethanol where the proportion has been 1:100 within a round vial. The vial has been tightly filled up to around two-thirds of the respective space with a cork followed by offering 10 downward strokes (Datta, 2020). The potency (times at which a remedy has encountered dilution and succession) has been prepared by diluting every potency with around 90% of ethanol within the same proportion to prepare the medicine to term it as a phytomedicine. This experiment has been conducted in the “*Sriniketan Sericultural Composite Unit*” located in West Bengal, India where the temperature is always between  $28 + 5^\circ\text{C}$  while relative humidity is around  $75 + 5\%$ .

## Flavonoids

Flavonoids possess the ability to prevent the disease and treat it and are widely popular as phytomedicines. Flavonoids are some natural substances that can be found in some *fruits*,

stems, vegetables and others (Ngwa *et al.* 2020). The materials that have been assumed are “*Paulownia tomentosa* (Thunb.) Steud” and also “*Cullen corylifolium* (L.) Medik”.

### Preparation



Figure 6: “*Cullen corylifolium* (L.) Medik”

(Source: Influenced by Benarba, and Pandiella, 2020)

The plants that have been considered for obtaining flavonoids are “*Cullen corylifolium* (L.) Medik”, and “*Paulownia tomentosa* (Thunb.) Steud” (Benarba, and Pandiella, 2020). The ethanolic extract has been collected from the seeds of the “*Cullen corylifolium* (L.) Medik” plant with “ $IC_{50}$  of  $15 \mu\text{g/ml}$ ”. This extract has an inhibitory effect in terms of restricting or causing inhibition of SARS-CoV. The essential flavonoids that are present in this specific extract are “*Bavachinin*”, “*isobavachalcone*”, “*psoralidin*”, “*40-O-methylbavachalcone*” and others that possess the property to inhibit SARS-CoV activity. In this aspect, the extract has played the main role to cause in inhibiting the virus.



Figure 7: “*Paulownia tomentosa* (Thunb.) Steud”

(Source: Influenced by Benarba, and Pandiella, 2020)

On the other hand, another plant which has been considered is “*Paulownia tomentosa* (Thunb.) Steud” which contains around geranylated flavonones such as “*tomentin A*”, “*tomentin B*”, “*tomentin C*”, and others. These flavones have been derived from ethanolic extract of the chosen plant. These flavonoids have a dosage of around “*IC50 of 5.0 and 14.4 μM*” which possesses a restricting effect. It has been witnessed during this experiment that *Tomentin E* possess the highest restricting impact which is around “*IC50 of 5.0 ± 0.06 μM*” (Benarba, and Pandiella, 2020). However, it is the molecules that contain higher inhibition in the form of around “*3,4-dihydro-2H-pyran moiety*”.

## RESULT AND DISCUSSION:

Medicinal plants are seen to be essential sources of *biotherapeutics* (drug therapy) development. There have been *genera of different plants* and also *herbs* that has be illustrated through clinical trials that have eventually showcased the effective potential to cure such a pandemic (Nasir Ahmed, and Hughes, 2022). The results and discussion of this section have been related to the experiments that have been discussed above.

### FIV and RCF values of plants

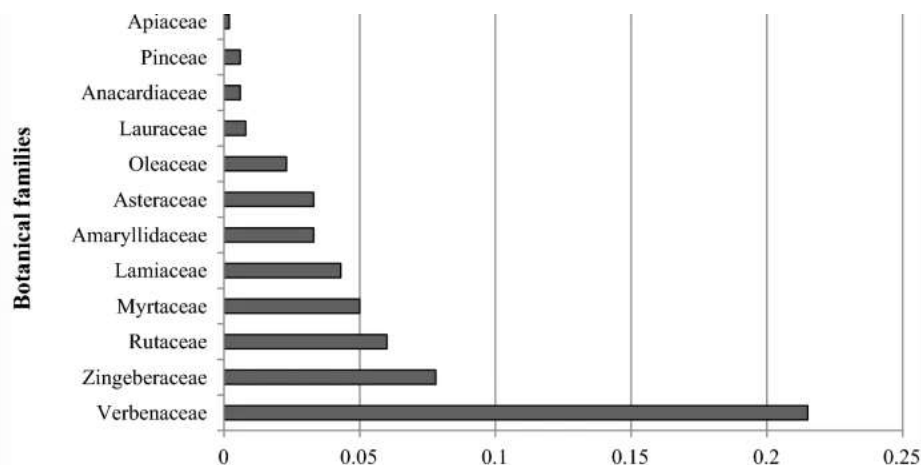


Figure 8: Family Importance Value (FIV) of some chosen medicinal plants

(Source: Brahmi *et al.* 2022)

The FIV is required to be considered where the value of FIV of “*Verbenaceae*” has been around 0.248 whereas the other values are 0.09 for “*Zingiberaceae*”, 0.07 for “*Rutaceae*”, 0.059 for “*Myrtaceae*”, 0.050 for “*Lamiaceae*” and others (Brahmi *et al.* 2022). The FIV values are important as these values indicate that these botanical families are ideal for the treatment of the virus. The FIV values have also been shown in the above table to understand the different FIV values and to identify the botanical family. Conversely, “*relative citation frequency*” (RCF) has also been considered to evaluate the importance of ancestral knowledge. RCF indicates the usage of relevant plant species to make use of those particular plants as phyto-medicines.

“*Aloysia citriodora Palau*” has an RCF value of around 0.248, “*Mentha spicata L*” has a value of around 0.145 whereas the RCF values of other plants such as “*Citrus limon (L.) Osbeck*” is 0.135 and others (Brahmi *et al.* 2022). “*Zingiber officinale Roscoe*” and also “*Eucalyptus globulus labill*” are some plants that are capable of modulating voices concerning the improvement of the immune system and also the advancement of the pathogenesis of different variants of pathologies of Covid19 (Najem *et al.* 2022). Ginger and “eucalyptus” have been the most used plants for treating different respiratory symptoms associated with Covid19. “*Eucalyptus globulus Labill*” has been considered to be the most utilised to prevent the pandemic. These plants have acted as phytomedicines as these plants contain various bioactive substances which include phenolic acids, glycosides, carotenoids, flavonoids and others. In case, these plants have been analysed as per FIV and RCF then medicines from aerial parts of these plants can be developed.

### Effective solution through plants like *Withania*, *Tinospora*, *Curcuma*

There are different plants that have been effective for reducing potential health issues among people during the COVID-19 pandemic situation. “*Withania somnifera (Ashawagandha)*” is one of the most useful plants and revered herb which are used as Rasayana in the Ayurvedic system of India. This herb is used for different types of diseases but specifically as a nervine tonic as it helps to reduce stress level. Scientifically, there are several health benefits of the specific herb such as it not only helps to reduce anxiety and stress but also helps to maintain blood sugar level (Forbes, 2022). Thereafter, the herb plays a significant role in the increment of strength and muscle as well as contributes in better heart health. Anti-ulcerogenic effects, anabolic effects, leucocytosis effects, “cortisol and ascorbic acid contents of adrenals” effects are the other positive impacts of the plant.

On the other hand, “*Tinospora cordifolia*” which is known as “Guduchi” in Indian Ayurvedic system is considered as safe therapeutic applications. The “hepato-protective properties” in the plant is beneficial for different diseases such as chronic diarrhea, dysentery, cancer, bone fracture, skin disease and others (Pib.gov.in, 2021). In addition to that, “*Curcuma caesia*” which is black turmeric, is another significant plant that can contribute to better health during the pandemic situation. Rhizome extracts, antimutagenic and antioxidant activity of “*Curcuma caesia*” are beneficial for different diseases such as asthma, piles, tumours, leukoderma, bronchitis and others (News18, 2022). Hence, these are the effective solutions from the plants that can improve health conditions of people during the pandemic crisis.

### Use of Flavonoids as phytomedicines

The flavonoids can be obtained from different plants such as “*Cullen corylifolium (L.) Medik*” and others as derived and pointed out in different experiments above. Flavonoids have been seen to contain a set of polyphenolic compounds which possess a “benzo- $\gamma$ -pyrone structure” and are present everywhere within the plants (Ullah *et al.* 2020). These flavonoids are seen to be synthesised through the “phenylpropanoid” pathway. Flavonoids are witnessed



to induce a system of protective enzymes which has proved to be beneficial for treating the selected disease (Schrenk *et al.* 2020). Thus, flavonoids as phytomedicine derived from different plants have certain protective effects against the infections associated with bacterial and viral diseases. Apart from these plants, “*Matricaria recutita L.(chamomile) flower*” possesses a flavonoid content of around “ $157.9 \pm 2.22$  mg/g QE” which also has the potential to decrease the rate of Covid19 outbreak.

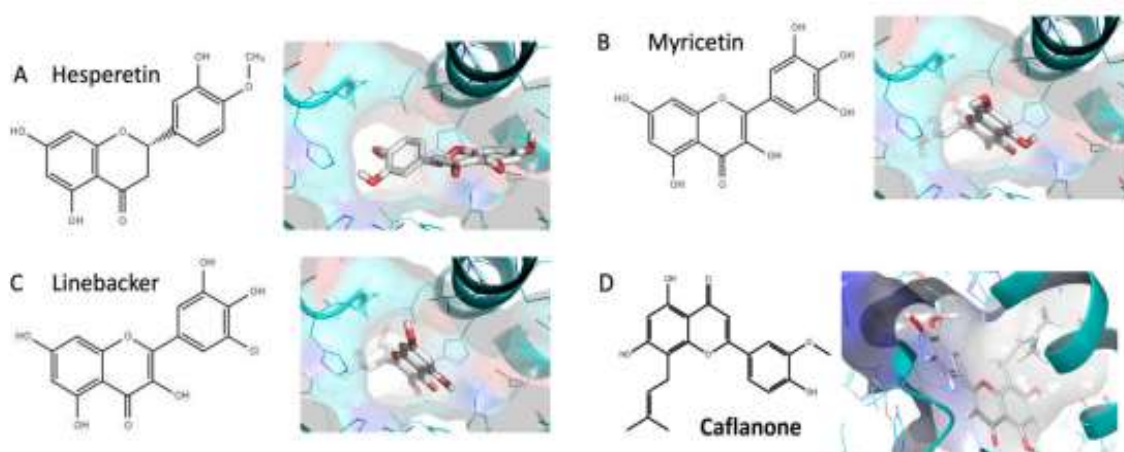


Figure 9: Different types of flavonoids as phytomedicines

(Source: Ngwa *et al.* 2020)

The binding energy has been evaluated and has encountered clinical trials to fetch effective results. It can bind with its high affinity with spike protein, protease sites and also helicase on the “*angiotensin-converting enzyme 2*” (ACE2 receptor), which causes certain conformational changes to further refrain the entry of the chosen virus. As SARS-CoV-2 makes use of the ACE2 receptor that has been found in abundance within the respiratory tract along with in the lungs to impact the different cells (Bhattacharya *et al.* 2021). “*CoV-2 spike glycoprotein*” is capable enough to bind “ACE2 cellular receptors” to enhance fusion and entry within the cells. *Chloroquine (CLQ)* (medication for treating Malaria) has been investigated in the form of “*prophylactic*” as well as “*therapeutic*” and has been seen to possess the capability to refrain the CoV-2 activity (Ngwa *et al.* 2020). Flavonoids as phytomedicine are more effective in comparison with CLQ. It is in the form of “*hesperetin*”, “*Linebacker*”, “*caflanone*” and others. The immune system of people encountering Covid19 can also be boosted either through *phytotherapeutic medicines* or *phytomedicines*.

On the other hand, alkaloids, steroids and terpenoids are other secondary metabolites produced by different plants. Alkaloids are the “naturally occurring organic nitrogen-containing bases” in different plants such as “*Papaveraceae*”, “*Amaryllidaceae*”, “*Ranunculaceae*” and “*Solanaceae*” (Hindawi, 2022). Along with that, steroids can be identified in plants such as “*Solanum xanthocarpum*”, “*Glycyrrhiza glabra*” and others.

## CONCLUSION:

The review article has been important to consider the different plants that can be used for preparing diverse medicines to identify them as phytomedicines which are naturally prepared from plants to cure an unprecedented disease. The article has identified both the botanical family and plants to address the need of treating the disease. “Lenzilumab”, “Sabizabulin”, “Dexamethasone” and other medicines have failed to cure and tackle the increase of the pandemic which have been reviewed as well through identifying the reasons that caused the failure of these medicines. The article has broadened the possibilities of the treatment which can be considered in the present times as well as in the future in case of Covid19 outbreak around the world.

Failure of these medicines has called for the urgency to look after phytomedicines as an alternative through various plants such as "Acacia auriculiformis A. Cunn", "Cullen corylifolium (L.) Medik" and others within this review article. The article has identified the materials and various methods where powdered fruits, ethanol, desiccator, geranylated flavonones and others to experiment within the scope of the article. The article has successfully identified the fact that even flavonoids have the potential to act as phytomedicines to offer treatment for this particular disease.

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