

AYURVEDIC THERAPEUTIC APPROACHES FOR THE MANAGEMENT OF COVID-19

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ABSTRACT

There is a known case of a Coronavirus disease (COVID-19)-positive patient treated entirely with Ayurveda. The Coronavirus disease (COVID-19) caused by the virus SARS-CoV-2 has become a global pandemic in a very short time span. Currently, there is no specific treatment or fully effective vaccine to counter this highly contagious disease.

There is an urgent need to find a specific cure for the disease and global efforts are directed at developing SARS-CoV-2 specific antivirals and immunomodulatory and adaptogenic effects, and more recently has been included as therapeutic adjuvant for several maladies. Amongst several others, Withania somnifera (Ashwagandha), Tinospora cordifolia (Guduchi) and Asparagus racemosus (Shatavari) play an important role in Rasayana therapy. The classical texts of Ayurvedic medicine such as Charaka Samhita and Sushruta Samhita contain descriptions of pandemics of similar proportions and describe them as Janapadoddhvansa, meaning the destruction of communities, along with their causes and treatment.

Ayurveda and Yoga can certainly play a pivotal role to augment preventive measures provided in the guidelines by Ministry of Health and Family Welfare (MoHFW). Medicinal plants are the fundamental unit of traditional medicine system. This communication reviews the AYUSH recommended formulations and their ingredients, routinely used medicinal plants and formulations by Indian population as well as other promising Indian medicinal plants, which can be tested against COVID-19.

Keywords: Ministry of Health and Family Welfare (MoHFW), COVID-19, AYUSH, SARS-CoV-2, Ayurvedic medicine, World Health Organization (WHO).

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INTRODUCTION

Novel coronavirus (nCoV-2019) also termed as severe acute respiratory syndrome Coronavirus 2 (SARS-CoV-2) causing novel coronavirus disease 2019 (COVID-19) is an ongoing pandemic outbreak of coronavirus family, initially appeared in Wuhan, China, on 17th November 2019 in a 55-year old person, according to the unpublished Chinese media reports. ^[1,2]

Though, the cause of the illness has not been clearly identified till date but bats were considered as primary reservoir of virus. China reported Country office of World Health Organization (WHO) regarding unusual pneumonia cases in Wuhan (Central Hubei Province) for the first time on 31st December 2019. ^[3,4] Ayurveda and Yoga can certainly play a pivotal role to augment preventive measures provided in the guidelines by Ministry of Health and Family Welfare (MoHFW). The current understanding of COVID-19 indicates that good immune status is vital to prevention and to safeguard from disease progression. ^[5]

In India, the traditional medicine system of Ayurveda is being explored for the prevention and treatment of COVID-19. Rasayana, unique concept of Ayurveda linked with the immunomodulation may play an important role in COVID-19 management. ^[6,7] The Ministry of AYUSH, Government Of India released an advisory for public use detailing Ayurveda based preventive measures for COVID-19, ^[8] it was widely promoted and accessed. Pragmatic use of Ayurveda as per the COVID-19 disease severity was proposed as early as in March-April 2020. ^[9] Some states in India formally initiated the use of Ayurveda treatment along with conventional modern medicine treatment for COVID-19 earlier than the release of the National Protocol for Management of COVID-19 including Ayurveda interventions. ^[10] The Ayurveda intervention in this study comprise of a mix of selected formulations with several actions. *Dashamula*, a group of ten herbs, alone and its combination with aspirin showed anti-inflammatory, analgesic, and anti-platelet effects comparable to aspirin. ^[11] *Pathyadi Kwatha* is a classical Ayurveda polyherbal formulation prescribed for the treatment of upper respiratory tract infections and different types of headaches. ^[12] Some of these ingredients have been evaluated in experimental models of inflammation and pain and have shown to possess anti-inflammatory and analgesic activities. ^[13,14] *Trikatu* powder augments the metabolic process by quick absorption of nutrients. ^[15,16] Piperine, an alkaloid, active component of Pippali increases the bioavailability of drugs and nutrients. ^[17] *Guduchi Ghana* (also known as *Samshamani Vati*) is another important “*Rasayana*” ^[18] medicine found to have anti-inflammatory, ^[19] immunomodulatory, ^[20] anti-allergic, ^[21] and anti-diabetic ^[22] properties.

AYUSH-64 is a polyherbal proprietary formulation recognized for malarial fever. ^[23] Therapeutic strategies for COVID-19 have focused on agents to attack the virus or immunize against it. This leaves aside the consideration of the host—one of the most important factors in disease dynamics. Ayurveda pays particular attention to the host and recommends measures for a healthy lifestyle rather than mere prescription of medicine. *Charaka Samhita*, ^[24] the classic of Ayurveda, describes epidemic management and defines immunity as the ability to prevent disease and arrest its progress to maintain homeostasis. The concept of building strength of mind and body to cope with various

stressors, including infection, is a cornerstone of Ayurveda practice. Similar to innate and acquired immunity, the Ayurveda concept of immunity (*Bala* or strength) is classified as natural (*Sahaja*), chronobiologic (*Kalaja*), and acquired (*Yuktikrut*). The holistic approach of Ayurveda toward promoting health (*Swasthavritta*) includes personalized interventions based on host and environmental factors. The interventions include therapeutic cleansing procedures (known as *Panchakarma*)^[25] and certain immunomodulators^[26] (known as *Rasayana*). Local^[27] and systemic^[28] interventions to boost the immune system have been advocated to manage respiratory illnesses. The choice of specific Ayurveda therapeutic agents and practices is based on certain individual genetic characteristics known as *Dosha Prakriti* types (*Vata*, *Pitta*, and *Kapha*).^[29]

Ayurveda is a system of traditional Indian medicine which is based on sound therapeutic principles and has a proven history of empirical use^[30, 31]. It is one of the world's oldest holistic healing systems. According to the Ayurvedic system of medicine, a healthy person should have a stable equilibrium (congenial homeostasis) of *Doshas* (*Vata*, *Pitta*, *Kapha*—psycho-biological rhythms), *Agni* (metabolism/digestion), *Dhatu* (body tissues/elements that provide them nourishment) and *Mala*(excreta), and the well-being of senses, mind and soul^[30]. Every individual has a unique combination of these constituent elements, which is known as the individual's *Prakriti* or unique mind-body constitution (*Ashtanga Hridaya*, *Sharira Sthana*, Chapter 3, Verse 83)^[32]. When an imbalance occurs in this equilibrium, it causes disease, and the Ayurvedic system of medicine seeks to remove this imbalance, to regain a healthy state^[30, 31]. The occurrence of disease can be further understood as follows: the abovementioned constituent elements have a propensity to change, influenced by various factors such as the environment we live in, change in seasons, the food that is consumed, negative experiences, presence of physical toxins, irritants, micro-organism or impurities, unhealthy habits and emotions. These influences distort the natural balance of these elements in an individual, increase *ama* (toxins), contributing to *vikruti* (vitiation of the constituent elements); this imbalance manifests as a lack of energy, excess mucous, inflammation, and a wide variety of dysfunction and diseases^[30,31,33]. By using the Ayurvedic principles, the unique *Prakriti* (constitution) of the individual is assessed, the *vikruti* (vitiation) that has occurred is diagnosed and a personalized treatment plan is advised accordingly. Thus, the Ayurveda system of medicine is inherently personalized, which treats the patient by considering the individual constitution (*Prakriti*) as well as the causes of the symptoms (*vikruti*). Classical Ayurveda texts such as *Charaka Samhita* (*Vimana Sthana*, Chapter 3)^[31] and *Sushruta Samhita* (*Sutra Sthana*, Chapter 6, Verses 19, 20)^[30] contain descriptions of pandemics and describe them as *Janapadoddhvansa*—*Jana-pada* (meaning community) + *Udhvansa* (meaning destruction), literally translating to “destruction of communities.” These texts offer specific guidelines with regard to the treatment of diseases that affect people during *Janapadoddhvansa*.

A recent pilot study claimed AYUSH-64 as add-on to standard care is safe and helped recover from Influenza-like illness (ILI) symptoms^[34] however, generalizability of its outcomes to COVID-19 is cautioned.^[35] *Yastimadhu* (*Glycyrrhiza glabra* Linn.) possesses many pharmacological activities like antiviral, antimicrobial, anti-inflammatory,

and antitumor activities.^[36] Pharmacological actions, target and mechanism of action of these multi-herbal formulations with numerous bioactive compounds in COVID-19 remain unexplored. The network pharmacology approach may serve as a valuable tool for evidence-based Ayurveda to understand the medicines' putative actions, indications, and mechanisms.^[37] Further, multimodal Ayurveda treatment may be better explained by whole system approach in its own theoretical framework.

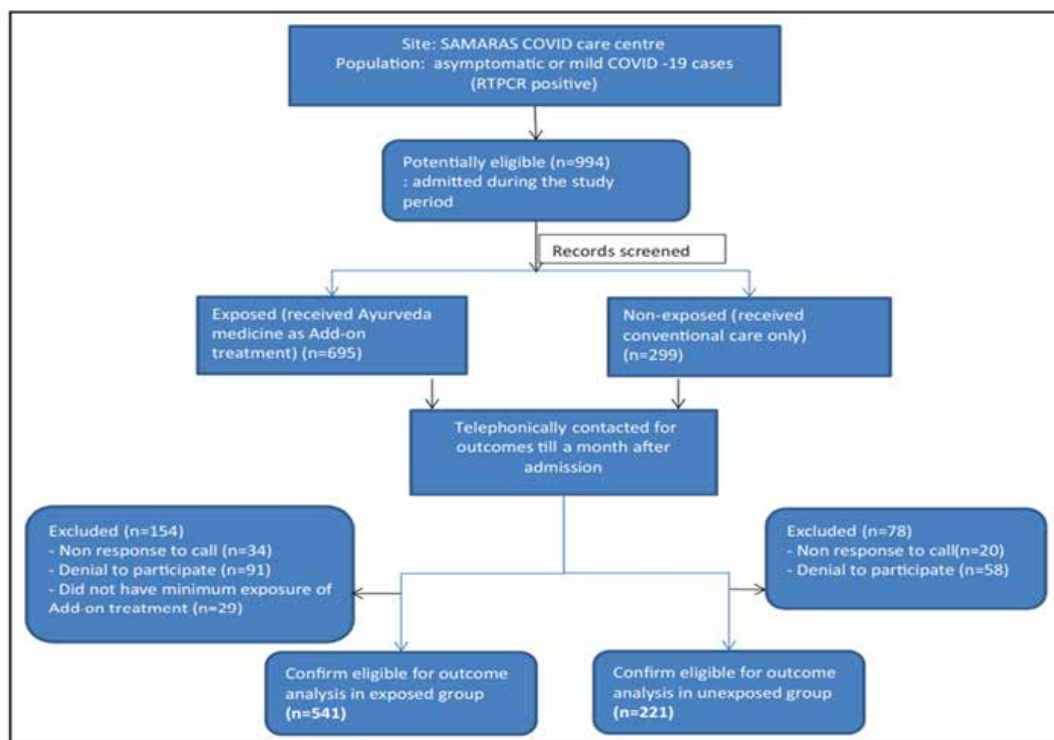


Fig. 1 Flow chart of the study procedure

Preventive Measures:

- 1) **Stay aware** of the latest information on the COVID-19 outbreak available on official websites of national public health authorities. Follow advice given by your healthcare provider, your national health authorities or your employer on how to protect yourself and others from COVID-19.
- 2) **Hygiene**
 - a) Wash hands frequently with an alcohol-based hand rub or wash them with soap and water.
 - b) Washing hands with soap and water or using alcohol-based hand rub kills viruses that may be on hands.
 - c) Physical touch and shaking hands to greet are to be avoided.

- d) Spitting in the public is discouraged.
- e) Frequent touching of eyes, nose and mouth that can pick up viruses is to be avoided. Once contaminated, hands can transfer the virus to your eyes, nose or mouth. From there, the virus can enter your body and can cause infection
- f) Usage of gloves should be encouraged whenever possible.

Practicing good respiratory hygiene is to be encouraged. This means covering mouth and nose with bent elbow or tissue paper / handkerchief when one cough or sneeze. After coughing or sneezing dispose of the tissue paper / Wash the handkerchief.

- 3) **Social Distancing** a. Advice maintaining social distance of at least one meter (3 feet) with anyone who is coughing or sneezing. Advice also not to go into crowded places like parks, markets and religious places. b. Advice to stay home to the best possible extent and reschedule traveling, if any. c. If anyone has fever, cough and difficulty in breathing, advice to consult a physician immediately and all instructions are to be followed meticulously.
- 4) **Additional care** is to be observed in case of elderly, children, or if the individual is immune-compromised or with co-morbidities or in case of women during and after childbirth.
- 5) **COVID-19** positive women can breastfeed if they wish to do so. They should be encouraged to practice all hygienic / preventive measures mentioned above.
- 6) **DIET:** Proper nutrition is to be ensured through freshly cooked hot food considering individual's digestive power.

Intake of comfortable warm fluids boiled with medicinal herbs (preferably Shunthi, *Dalchini*, *Trikatu*) should be used as a regular drink to maintain hydration.

- Freshly prepared *Laghu-supachyaahara* (easily digestible, light diet).
- Preferable vegetables are Shigru (*Moringa oleifera* Lam), Karvellaka (*Momordica charantia* Linn), Patola (*Tricosanthes dioica* Roxb), Mudga (*Vignaradiata* (L.) R. Wilczek), Patha (*Cissampelos parietal* Linn.), Vaastuka (*Chenopodium album* L.), Jivanti (*Leptadenia reticulata* (Retz.) Wight & Arn), Tanduliyak (*Amaranthus spinosus* L.), Kakamachi (*Solanum nigrum* Linn), Draksha (*Vitis vinifera* L.), Kapittha (*Feronia limonia* (Linn.)), Dadima (*Punica granatum* Linn), Lahsuna (*Allium sativum* L.) etc. are to be taken.^[39]
- Restrict use of sweet food items as these are heavy to digest. (*Yoga Ratnakara*) Also advise not to use chilled, fried, oily, fermented food items, cold and refrigerated food / beverages.
- **Cope up with stress:**
 - It is normal to feel stressed, scared or angry during the lockdown period.
 - Talking to people can help to cope with stress.
 - Contact friends and family as frequently as possible.

- Encourage maintaining a healthy lifestyle. Proper diet, sleep, exercise and social contacts with loved ones at home and by email and phone with other family and friends can be encouraged.
 - Also encourage reading books, listening to light music as per the interest to counter stress.
 - Avoid smoking and consumption of alcohol or other drugs to deal with stress. Consultations can be provided, if physical and mental health needs are required.
 - Child's reactions are to be encouraged to be addressed in a supportive way.
 - Let their concerns be listened carefully and extra time, love and attention to be given.
- 7) Exercise and meditation, daily practice of Yogasana, Pranayama for at least 30 minutes as advised by the Ministry of AYUSH is to be practiced.
 - 8) Adequate sleep of 7-8 hours at night is essential and should be encouraged. Preferably, advice to avoid day time sleep.
 - 9) If any co-morbidities exist; medicines as prescribed are to be encouraged to be taken under supervision. Avoid self-medication.
 - 10) Seasonal regimen (*Ritucharya*) under the consultation / supervision of Ayurveda Physician is always to be encouraged.
 - 11) Usage of adequate Personal Protective Equipment (PPE) during medical practice as advised by health care authorities is to be encouraged. [38]

Current Guidelines: [40-45]

WHO has adopted guidelines for the clinical management of severe acute respiratory infection when SARS-CoV 2 infection is suspected. It is intended for clinicians involved in the care of adult, pregnant, and paediatric patients with or at risk for severe acute respiratory infection (SARI) when infection with the COVID-19 virus is suspected.

IMMUNITY IN AYURVEDA

In Ayurveda, immunity is referred to as *vyadhikshamatva*. Ayurveda has a comprehensive approach of immunity encompassing management. *Vyadhikshamatva* is the resistance of the body to fight a disease by either of the following two ways:

- *Vyadhi-Bala-Virodhitvam* – The resisting power of the body to restrain or withstand the strength or severity or progression of a disease, or
- *Vyadhi-Utpada-Pratibandhakatvam* – The resisting power of the body to prevent the manifestation of a disease.

Significantly various modifiable factors have been enlisted in Ayurveda that influence the host defense responses (*Bala/Vyadhikshamatva*). These factors include a healthy diet (*Pathyaahara*), condition of biological humors (*dosha*) and the state of physical and mental health (*Sareera*). The previous Covid 19 related advisories issued

by the Ministry of AYUSH are based on this host defense mechanism or salute-genesis and also on various empirical evidences available from peer-reviewed and indexed publications.^[8]

Immunity Enhancers - Single Drugs: [40-45]

- a) Guduchi: Consuming 500 to 1000 mg of aqueous extract of Guduchi (*Tinospora cordifolia* (Thunb.Miers)
- b) Amla: Consumption of fresh Amla fruit (Indian gooseberry – *Embilica officinalis* L/ *Phyllanthus emblica* L) or Amla candy is also advisable.
- c) Haridra: Gargling with warm water added with turmeric powder (*Curcuma longa* L) and a pinch of salt or Turmeric (*Curcuma longa* L)
- d) Tulasi: Frequent sipping of water processed with Tulsi (basil leaves – *Ocimum tenuiflorum* L Merr (synonym *Ocimum sanctum* L) is advised.
- e) Ashwagandha root powder 3-5gm twice a day with warm milk or water/ ashwagandha extract 500mg twice a day with warm water.

Immunity Enhancers - Formulations: [40-45]

- a) CHYAWANPRASH AVALEHA - 10 - 12 gm / 1 Spoon
- b) DRAKSHAVALEHA - 10 - 12 gm / 1 Spoon
- c) INDUKANTAM GRUTHAM - 10 - 12 gm twice daily before food, when hungry
- d) ARAVINDASAVA - 15 - 20 ml with equal quantity of warm water after food
- e) BALACHATURBHADRA CHURNA - 1 - 2 gm with honey
- f) HARIDRA KHANDA - 3 - 5 gm intermittently with honey/ warm water

LIMITATIONS

This study has some limitations such as participants were included only from single-center which has limitations to the representativeness of participants. The sample size was small for analysis on mortality and randomization was not possible this being a retrospective study. Considerable proportion of potentially eligible patients could not be accessed due to their nonresponse or denial to participate. Some parts of data collection through telephonic interview may induce recall bias and observer bias. The possibility of erroneous records cannot be denied, although it was small and will not change the results. Participants were treated with multiple formulations, so the individual effect of these drugs on disease is out of the scope of the study. “Time taken for RT-PCR test negative” could not be analyzed because testing policy varied throughout the study period. The results can be constricted to the early stage of COVID-19 patients with a lower risk of disease severity.

AYURVEDIC INTERPRETATION OF THE PATIENT’S CONDITION DIAGNOSIS

Based on the above history and discussion with the Ayurvedic doctor and Yoga consultant, the diagnosis of the patient’s illness included COVID-19, with type 2 DM, HTN,

hypothyroidism and CKD. Except for the inability to perform a physical examination, no known diagnostic challenges were encountered.

Pathophysiology:

According to Ayurvedic principles, because jwara (fever), shvasa (respiratory distress) and kasa (cough) are the three major symptoms of this roga (disease), the roga marga (pathway of disease) of this roga can be considered to be Abhyantara (internal origin). Because there is respiratory distress, along with other symptoms, there is Pranavaha Srota Dushti (obstruction of the Pranavaha Srotas, that is, the subtle micro-channels in the body that are the pathways for the vital life force); also, one of the primary seats of this disease is Uras (chest region). Based on these observations, this disease can be characterized as Agantuja Sannipataja Jwara, wherein Vata-Kapha doshas are primarily vitiated. In Agantuja Sannipataja Jwara, Agantuja implies Agantu (external), which is caused by Bhoota Abhishanga (external causative factors like a virus); this in turn causes the vitiation of all three Doshas, that is Vata, Pitta and Kapha. Because of the vitiation of all three Doshas, the term Sannipataja is used. As per Ayurvedic principles, the treatment of such a Jwara is similar to that of Nija Jwara, that is, one caused by vitiation of Doshas. Etiology According to Ayurvedic principles, this disease can be correlated with Agantuja Sannipataja Jwara, wherein Vata-Kapha are primarily vitiated. Furthermore, this is an extremely contagious disease, caused by Bhoota Abhishanga (external causative factors like virus), that is characterized in Ayurvedic texts as a Janapadoddhvansa disease. Classical Ayurvedic texts like Charaka Samhita (Vimana Sthana—Chapter 3) and Sushruta Samhita (Sutra Sthana, Chapter 6, Verses 19, 20) contain descriptions of similar pandemics, and describe them as Janapadoddhvansa—Janapada, meaning community + Uddhvansa, meaning destruction—literally translating to destruction of communities. The symptoms of illness during Janapadoddhvansa, as mentioned in classical texts, include cough, dyspnea, asthma, vomiting, nasal catarrh (common cold), headache and fever. These texts also offer specific guidelines with regard to the treatment of diseases that affect people during Janapadoddhvansa, which include Ayurvedic medicines and spiritual practices. ^[46-53]

Therapeutic Intervention:

This section presents the detailed treatment plan as well as the details of the subsequent compliance of the patient.

Treatment Plan:

- 1) The treatment plan comprised Ayurvedic medicines, including Giloy Ghanvati, Ashwagandha vati, Pathyadi Kwath (pravahi) and Diabecon;
- 2) Yoga protocol, consisting of Sukshma Vyayama, breathing exercises, Asanas, Shavasana, Pranayama and Dhyana;
- 3) dietary modifications such as Usha Paan, intake of fruits and green vegetables, and avoiding cold or heavy to digest food; and
- 4) lifestyle modifications such as adoption of spiritual practices.

Table 1: Composition of Ayurvedic Medicines

Common name	Botanical name
Giloy Ghanvati Giloy	<i>Tinospora cordifolia</i>
Ashwagandha vati Ashwagandha	<i>Withania somnifera</i>
Pathyadi Kwath (pravahi)	
Harad	<i>Terminalia chebula</i>
Baheda	<i>Terminalia bellerica</i>
Neem chhal	<i>Azadirachta indica</i>
Amla	<i>Emblica ofcinalis</i>
Giloy	<i>Tinospora cordifolia</i>
Haldi	<i>Curcuma longa</i>
Diabecon	<i>Asphaltum punjabianum</i>
Shilajeet	<i>Gymnema sylvestre</i>
Meshashringi/Gudmara/Madhunashini Peetashala/ Vijaysar/Indian Kino Tree	<i>Pterocarpus marsupium</i>
Turmeric	
Haldi	<i>Curcuma longa</i>

The following Ayurvedic medicines were prescribed: Giloy Ghanvati (three doses of two tablets each to be taken after meals with lukewarm water), Ashwagandha vati (two doses of two tablets each to be taken after meals), Pathyadi Kwath (pravahi) (15 ml mixed with an equal quantity of lukewarm water to be consumed twice a day 30 minutes after meals), and Diabecon (two doses of one tablet each to be taken 30 minutes before meals).^[54]

MEDICINAL PLANTS USED FOR COVID-19 CARE: - [55-75]

1. ASHWAGANDHA



Botanical name: *Withania somnifera* (L.) Dunal

Family name: Solanaceae

Description: A branched erect under shrub 0.3- 1.5m high. Branches terete, leaves 5-10 by 2.5-5cm ovate, subacute, entire, pubescent, base acute. Flowers greenish or light yellow, sessile. Seeds 2.5 mm diam, yellow, somewhat scurfy.

Vernacular Names: - English: Winter cherry, Sanskrit: Ashwagandha, Tamil: Amukara, Telugu: Penneru, Hindi: Asgandha.

Chemical Constituents: Withaferin A, withanone (dampen TMRSS2, enzyme function there by block spike protein's ability to (SARSCOV-2) to fuse with host cell receptor-ACE-2), withanolide WS-1, withanolide A to Y, somnirol, withasomniferin A

Properties and Action: - Pungent, bitter, astringent in taste, hot in potency, pungent in vipaka, action-alleviates vata and kapha, enhances strength, rejuvenative and increases sperm count.

Pharmacological principle: - Anti covid 19 activity, Anti pyretic, Anti-microbial, Antibacterial, Antioxidant, Immunomodulator, Antiinflammatory, Anti-malarial, cardio protective, neuro protective, hepato protective, Adaptogenic, Anti diabetic.

Parts used: Root, Leaf, Alkali.

Therapeutic Uses: - Fatigue, weakness, emaciation, tumors, dyspnoea, insomnia,

Dosage: - powder 3-6 gm

Important Formulations: - Ashwagandha churna, Ashwagandha arishtam

2. GUDUCI



Botanical name: - *Tinospora cordifolia* (Willd.) Miers.

Family name: - Menispermaceae

Description: - Shrub, climbing. Stem green when young and covered with dry papery bark. Leaves cordate, petiole pulvinate. Flowers in axillary raceme, male flowers polysepalous, sepals 3+3. Petals- 6, polypetalous, greenish, stamens- 6, free. Commonly found in all areas.

Vernacular Names: - English: Heart leaved moon seed, Sanskrit: Guduchi, Tamil: Amrida valli, Telugu: Tippateega, Hindi: Giloe

Chemical Constituents: - Tinosporin, Tinosporide, Cordifolide, Phenyl prophy glycoside.

Properties and Action: - Bitter and astringent taste, hot in potency, sweet vipaka, action alleviates all three dashas, relieves fever, Rejuvenative.

Pharmacological principle: - Anti pyretic, Antioxidant, Immunomodulator, Anti-inflammatory, anti-rheumatic, hepatoprotective, Anti rheumatic, hypoglycemic, Anti stress.

Parts used: Stem, leaf, aerial root.

Therapeutic Uses: - fever, cough, wheezing, brain tonic, hyperglycaemia.

Dosage: - Fresh juice-10 -20 ml; Powder -2-6 gm; Decoction-50- 100ml; satva 1-2gm.

Important Formulations: - Amrithadi kashayam, amritarishtam, Amritadhi guggulu, Balaguduchyadi tailam.

3. KALAMEGHA



Botanical name: - *Andrographis paniculata* (Burm. f.) Wall. ex Nees

Family name: - Acanthaceae

Description: Herb erects. Leaves opposite, elliptic-lanceolate, entire. Flowers long white with pink tinge in axillary and terminal paniced racemes. Not common.

Vernacular Names: English: green chiretta, Sanskrit: Kalamegha, Tamil: Nilavembu, Telugu: Nelavembu, Hindi: Kirayat

Chemical Constituents: Contains most bitter compounds andrographolide, neoandrographolide, deoxy andrographolide others 14 – deoxy andrographolide.

Properties and Action: Bitter taste, cold potency, pungent vipaka, action –alleviates kapha and pitta, appetizer

Pharmacological principle: Antiviral, Antipyretic, Antiperiodic, Immune Enhancement, Hepatoprotective, Vermicidal, Hypoglycemic, Thrombolytic.

Part used: Whole Plant

Therapeutic Uses: Fever, Respiratory infections, GIT infection, Sore throat, Variety of chronic infections

Dosage: Power 1-3 gm; fresh juice 5-10 ml; decoction 20-40 ml

Important Formulations: Bunimbadi Churna; Bhunimbadi Kasaya

4. TULSI



Botanical name: *Ocimum tenuiflorum* L.

Family name: Lamiaceae

Description: An undershrub, erect, much branched, aromatic. Leaves elliptic-oblongate. Flowers purple cream in racemes. Calyx purplish. Corolla white, purplish within. Stamens- 4, didynamous. Commonly found in all areas.

Vernacular Names: English: Sacred basil, Sanskrit: Tulasi, Tamil: Tulasi, Telugu: Tulasi, Hindi: Tulsi

Chemical Constituents: Bornylacetate, Cadinene, eugenol, eugenol methyl ether, methyl chavicol, limonene

Properties and Action: Pungent and bitter taste, hot potency, pungent vipaka, action-alleviates kapha vata, appetizer

Pharmacological principle: Anti-viral, Antifungal, Antibacterial, adaptogenic (anti stress), Hypoglycaemic, Anti spasmodic

Parts used: Leaf, root, seed

Therapeutic Uses: Intermittent fever, viral hepatitis, toxic disorders, dyspnoea, cough, worms

Dosage: Fresh juice 10-20 ml, root decoction 50-100 ml, seed powder 3-6 gm

Important Formulations: Surasadigana kashayam, tumburvadi yoga

5. VANA TULSI



Botanical name: *Ocimum basilicum* L.

Family name: Lamiaceae

Description: An erect herb. Leaves large. Flowers in terminal racemes. Calyx bilipped, lower lip hairy within. Corolla white; Stamen- 4, didynamous. Found in waste places.

Vernacular Names: English: Sweet Basil, Sanskrit: Vantulasi , Tamil: Tirunittru paccchillai, Telugu: Bhuttulasi, Hindi: Babui Tulsi

Chemical Constituents: Linalool, Methyleugenol, Methyl cinnamate, Phenolic acid– Rosemarinic acid; quercetin, luteolin apigenin, kaempferol, flavanoids, isoeugenol, Vitamin A, C, Calcium, Phosphorous, Beta – carotene.

Properties and Action: Pungent, cold potency, pacifies vata, kapha, improves taste perception, cardiac tonic, carminative

Pharmacological principle: Anti-viral, Anti-microbial, Anti-oxidant, Anti-inflammatory, Health promoting activities. Inhibitory activity in HIV – 1, fungistatic, Anti allergenic, Cytotoxic, Anti spasmodic

Parts used: Leaf, flower

Therapeutic Uses: Feverish illness (cold and influenza), lung complaints, poor digestion, nausea, insomnia, migrane, intestinal parasites. **Dosage:** Juice 3-5 ml; Seed powder 3-6 gm

Important Formulations: Surasadigana kashayam, tumburvadi yoga

6. TVAK

Botanical name: *Cinnamomum verum* Presl

Family name: Lauraceae

Description: Small tree with pale brownish, smooth, aromatic bark. Leaves elliptic-lanceolate, coriaceous, shining green on upper surface when mature. Flowers foetid in panicles, yellowish-white. Fruit dark purple, single seeded berry.

Vernacular Names: English: Cinnamom, Sanskrit: Tvak, Tamil: Ilavangam, Telugu: Lavangapatta. Hindi: Dalchini

Chemical Constituents: Cinnamaldehyde, eugenol, benzaldehyde, caryophyllene, methyl eugenol, cinnazeylanin, cinnacassioid

Properties and Action: Pungent bitter and astringent in taste, hot potency, pungent vipaka, action-alleviates vata pitta, improves strength.

Pharmacological principle: Anti complement activity, anti-allergic activity.

Parts used: Stem bark

Therapeutic Uses: Rhinitis, cough, headache, indigestion, to improve taste, worm infestation, cardiac ailments

Dosage: Powder 1 -3 gms

Important Formulations: Eladi rasayanam, sitopaladi choorna, samasarkara choorna

7. ARDRAKA

Botanical name: *Zingiber officinale Roscoe*

Family name: Scitaminae/Zingiberaceae

Description: An erect, slender and herbaceous plant, grow up to 1.8 m high. Shoots (pseudostems) extend above ground, arising from buds on the underground rhizomes, which are thickened, branched, somewhat resembling a swollen hand.

Vernacular Names: English: Ginger, Sanskrit: Ardhraaka, Tamil: Inji/chukka, Telngu: Allaem, Hindi: Sonth

Chemical Constituents: Alpha curcumene, citral, citronellol, gingerol, zingiberenes, zingiberol, zingerone, gingerols, gingerenone A

Properties and Action: Pungent taste, hot potency, sweet vipaka, action-alleviates Vata Kapha, improves digestion

Pharmacological principle: Anti-bacterial, Anti histaminic, Anti-oxidant, Anti-inflammatory, Hypoglycemic, Bio availability enhancer, Hypolipidemic

Parts used: Rhizome

Therapeutic Uses: Fever, dyspnoea, cough, heart ailments, reduced appetite, diarrhoea, blotted abdomen, bleeding disease, Anaemia.

Dosage: Fresh juice 5-10 ml; powder 1-2gm

Important Formulations: Ardhraaka rasayana, ardhraaka khandavalehya, nagaradi kashaya

8. HARIDRA

Botanical name: *Curcuma longa L.*

Family name: Zingiberaceae

Description: Rhizomatous herb, with sessile cylindrical tubers. Leaves in tufts, large. Flowers in spikes. Bracts pink

Vernacular Names: English: Turmeric, Sanskrit: Haridra, Tamil: Manzhal, Telugu: Pasuppu, Hindi: Haldi

Chemical Constituents: Curcumene, Curcumenone, Curcone, Cineole, Curzerenone, eugenol, procurcumenol, epiprocurcumenol, curcuminoids

Properties and Action: Bitter and pungent taste, hot potency, pungent vipaka, actionalleviates kapha vata

Pharmacological principle: Anti-bacterial, Anti-oxidant, Anti-inflammatory, Anti histamine, Anti septic, hypocholesterolemia, hydrochologogue

Parts used: Rhizome

Therapeutic Uses: Bronchitis, Respiratory illness, Bronchial asthma, tropical eosinophilia, diabetes, Anaemia, jaundice, skin disease, relieves toxicity

Dosage: Powder 1-3 gm

Important Formulations: Haridrakhanda, Nisamalaki Choornam

9. AMALAKI

Botanical name: *Phyllanthus emblica L.*

Family name: Euphorbiaceae

Description: A small deciduous tree, 8-12m high. Leaves oblong, 1-1.5×0.2-0.4cm; stipules minute, linear. Flowers in axillary fascicles; male and female flowers mixed, or more usually the upper male; tepals 6, oblanceolate; stamens-3, connate; styles broadly fimbriate, recurved, stigmatiferous. Drupe indehiscent, depressed-globose, fleshy, juicy, 3cm across. Seeds 3-gonous.

Vernacular Names: English: Goose berry, Sanskrit: Amalaki, Tamil: Nellikai, Telugu: Usirikaya, Hindi: Amla

Chemical Constituents: Vitamin c, phyllembin, linolic acid, indole acetic acid, corilangine, ellagic acid

Properties and Action: Predominantly sour, in taste, cold in potency, sweet vipaka, action – alleviates all three dosas, promotes longevity, Rejuvenative, aphrodisiac.

Pharmacological principle: Anti-bacterial, Anti-microbial, Anti-oxidant, Anti-inflammatory, Hepatoprotective, Hypolipidemic, Anti atherosclerotic, Hypoglycaemic.

Parts used: Fruit pulp.

Therapeutic Uses: Diabetes, bleeding disorders, dysuria, ulcer, leucorrhoea.

Dosage: Fresh juice-10-20 ml; powder 3-6 gm

Important Formulations: Chyavanaprasha avalehyam, amalakadi churna.

10. KIRATATIKTA

Botanical name: *Swertia chirata Buch.-Ham. ex Wall.*

Family name: Gentianaceae

Description: Rhizomatous herbs; rhizome thick, dull yellow. Leafy stem to 60 cm high. Leaves to 25 x 2 cm, elliptic-oblong, acuminate. Peduncles to 30 cm long, erect; spike 3-5 x 3 cm, obovoid; bracts 2.5 x 2 cm, obovate, green.

Vernacular Names English: Chiretta, Sanskrit: Kiratatikta, Tamil: Nilavembu, Telugu: Nilavembu, Hindi: Chirayata

Chemical Constituents Amarogetin, gentiopicrin, chiratol, swerchirin, gentianine, swertianin, kairatenol, swertenol, beta sitosterol.

Properties and Action Bitter taste, cold in potency, pungent vipaka, action – alleviates kapha pitta, relieves sannipata jwara.

Pharmacological principle Anti pyretic, Anti arthritic, Anti diabetic, Hepatoprotective.

Parts used: Whole plant.

Therapeutic Uses: Fever, gouty arthritis, oedema, chronic liver diseases.

Dosage: Powder 1-3 gm; Decoction 50-100 ml

Important Formulations: Kiratadi kwatha, sudarsana churna, kiratathiktadi churna, kiratarishta.

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