



Document prepared by Nerve Center of TFORD, Venture Center, Pune
Task Force on Repurposing of Drugs (TFORD) for COVID19
 S&T Core Group on COVID19 constituted by PSA to Gol

Medicinal Herb Briefs: *Tinospora cordifolia*

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About this document: This document summarizes information available on medicinal herb candidates for COVID19. One Medicinal Herb Brief document covers one candidate at a time.

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1. Summary Information on *Tinospora cordifolia*

Information About the Herb for Reported Indication(s)	
Common Name	Guduchi, Heart-leaved moonseed, Gulanchatinospora, Gaduchi, and Giloy.
Botanical Name (Family)	<i>Tinospora cordifolia</i> (Menispermaceae)
Type of Plant/Source of Herbal Ingredients	Shrub Source - Leaves, Stem, Root, Whole plant https://europepmc.org/article/pmc/pmc2924974#free-full-text https://indiabiodiversity.org/species/show/231352
TKDL Information	70 mentions for this Herb on TKDL
Indian Pharmacopeia Information	Herbal Drug Monograph available in Indian Pharmacopeia 2018
Reported Pharmacological Effects	Anti-cancer, Anti-viral, Immunomodulatory, Anti-inflammatory, Anti-arthritis, Anti-allergic, Anti-oxidant, Anti-pyretic, Anti-ulcer, Diuretic, Osteoprotective https://europepmc.org/article/pmc/pmc2924974 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3644751
Reported Therapeutic Target(s)	B cells, NK cells
Reported Mode of Action	Immuno-modulatory Activity: <ul style="list-style-type: none"> <i>T. cordifolia</i> and its constituent α-D-glucan stimulate NK cells, B cells, and T cells with simultaneous production of various immune-stimulatory cytokines https://www.hindawi.com/journals/jir/2017/1787803/ Reports mention <i>T. cordifolia</i> can selectively inhibit viruses from targeting T-helper cells and prevent receptor mediated entry, enhance cell mediated and humoral immunity https://pubmed.ncbi.nlm.nih.gov/28260522/ Antibacterial Activity: <ul style="list-style-type: none"> G1-4A is a polysaccharide derived from the <i>T. cordifolia</i>. Reports show G1-4A treatment of <i>Mycobacterium tuberculosis</i> bacteria infected RAW264.7 macrophages significantly induced the surface expression of MHC-II and CD-86 molecules, secretion of proinflammatory cytokines (TNF-α, IL-β, IL-6, IL-12, IFN-γ) and nitric oxide leading to reduced intracellular survival of both drug sensitive (H37Rv) as well as multi drug resistant strains (Beijing and LAM) of <i>Mycobacterium tuberculosis</i>. Activity attributed to G1-4A induced

	<p>NO production in TLR4-MyD88 dependent manner. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4858241/</p> <p>AntiHIV Activity:</p> <ul style="list-style-type: none"> Attributed to <i>T.cordifolia</i>'s activity in reducing eosinophil count, stimulation of B lymphocytes, macrophages, polymorphonuclear leucocytes and hemoglobin percentage http://www.ancientscienceoflife.org/temp/AncientSciLife314151-2515689_065916.pdf https://bmcinfectdis.biomedcentral.com/track/pdf/10.1186/1471-2334-12-S1-P10
Herb is reported to be beneficial for which conditions?	<i>T. cordifolia</i> is used in the Indian Ayurvedic system of medicine for the treatment of Jaundice, Diabetes, and Rheumatoid arthritis. Also used as an immunostimulant. The Ayurvedic pharmacopoeia of India. Part I, Vol. I,
Is the herb or its extract form used for clinical purposes?	Yes – Both
Prescribed Dose	<ul style="list-style-type: none"> Kwath 50 - 100 ml, Churna 3 - 6 gm, Satva 1 - 2 gm The Ayurvedic pharmacopoeia of India. Part I, Vol. I, Allergic rhinitis (hay fever): 300 mg of a specific <i>T. cordifolia</i> aqueous stem extract three times daily for 8 weeks https://books.google.co.in/books?id=qfDQAAQBAJ&pg=PA1609&lpg=PA1609&dq=%E2%80%A2+Allergic+rhinitis+(hay+fever):+300+mg+of+a+specific+T.+cordifolia+aqueous+stem+extract+three+times+daily+for+8+weeks&source=bl&ots=BH8fbDysOo&sig=ACfU3U3i65aknbGqA0pgxHYdY_sHPZEIEA&hl=en&sa=X&ved=2ahUKewj0tM6S_KrpAhWszDgGHd57D6oQ6AEwAXoECAoQAQ#v=onepage&q=%E2%80%A2%20Allergic%20rhinitis%20(hay%20fever)%3A%20300%20mg%20of%20a%20specific%20T.%20cordifolia%20aqueous%20stem%20extract%20three%20times%20daily%20for%208%20weeks&f=false Chronic fever: SamshamaniVati (extract): 500 g with warm water, Twice a day for 15 day https://www.sciencedirect.com/science/article/pii/S0048969720317903#f0020
Route of Administration	Oral
Safety Profile (dose range in which it has been tested to be safe in humans)	Data not available
Adverse events/Side effects reported at the current prescribed dose	Limited clinical studies reveal few adverse reactions. GI symptoms (anorexia, nausea, vomiting) have been reported. No toxicity has been observed at Ayurvedic therapeutic doses. Hepatotoxicity has been reported with the medicinally interchangeable and related species, <i>Tinospora crispa</i> https://onlinelibrary.wiley.com/doi/abs/10.1002/ptr.2347 https://www.researchgate.net/publication/2884168
Reported Drug-Herb interactions	An in-vitro study reported <i>T. cordifolia</i> may have no significant interaction potential with the co-administered drugs https://europepmc.org/article/med/27721546
Link to Datasheet	Data not available
Regions where Herb is found	Local Distribution: Arunachal Pradesh, Assam, Bihar, Delhi, Gujarat, Goa, Karnataka, Kerala, Maharashtra, Odisha, Sikkim, Tamil Nadu, Uttar Pradesh, West Bengal Global Distribution: Asia: Bangladesh, India, Myanmar, Pakistan, Sri Lanka https://indiabiodiversity.org/species/show/231352
Is the Herb or Extract being sold in India?	Yes – Both
Indian Manufacturer(s)	Himalaya, Cultivator Natural Products Pvt. Ltd., Jodhpur. M/s Pharmanza India Ltd, Gujarat.
International Manufacturer(s)	Athreya Herbs, Banyan Trading Company, Verdure Sciences

Cost of the Herb and Extract products in India	Himalaya Guduchi (60 No) – Rs. 150
Information About the Major Bioactive for Reported Indication(s)- NOTE – THIS INFORMATION IS ONLY FOR THE MAJOR BIOACTIVE IN THE HERB	
What is the Major Bioactive in the Herb?	No Major Bioactive reported Constituents reported - Terpenoid (Tinosporide, Tinosporaside), alkaloid (Tinosporine, (S), Magnoflorine, (S), Berberine, (S), Choline.), lignans, steroids (Giloinsterol, (S), β -Sitosterol.) and Giloin https://www.sciencedirect.com/science/article/pii/S2405844019360979
Is the Major Bioactive, in isolated form used for clinical purposes?	Not applicable
Drug Bank ID	Not applicable
Reported Pharmacological effects	Not applicable
Reported Therapeutic Target	Not applicable
Reported Mode of Action	Not applicable
Bioactive is reported to be beneficial for which conditions?	Not applicable
Prescribed Dose	Not applicable
Route of Administration	Not applicable
Safety Profile (dose range in which it has been tested to be safe in humans)	Not applicable
Adverse events/Side effects reported at the current prescribed dose	Not applicable
Reported Drug-Bioactive interactions	Not applicable
Link to Datasheet for Bioactive	Not applicable
Is the Bioactive being sold in India?	Not applicable
Indian Manufacturer(s)	Not applicable
International Manufacturer(s)	Not applicable
Cost of the Bioactive in India	Not applicable
Information About the Candidate for COVID19	
Repurposing Claim	Prophylaxis & Treatment; New Indication (COVID19) + New Dose (not confirmed)
Rationale for Repurposing for COVID19/MoA? –	<ul style="list-style-type: none"> A randomized double blinded placebo controlled clinical trial using <i>T.cordifolia</i> extract on HIV patients reports - Extract related group, 60% reported decrease in symptoms, 30% reported no change and 10% patients reported deterioration. On the other hand in the placebo group, 40% patients reported an increase in symptoms, 40% patients reported no change and 20% patients reported decrease in symptoms. Authors suggest the use of the extract as an adjunct therapy in HIV. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2792597/

	<ul style="list-style-type: none"> A review article by Ayurvedic research groups suggest <i>T.cordifolia</i> could be considered for evaluation as a prophylactic therapy for COVID-19 https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7177084/
Proposed use as Primary or Adjuvant?	Primary and Adjuvant
Pre-Clinical Data available for COVID-19	Data not available
Status of Clinical Trials	5 trials ongoing in India (3 for prophylaxis and 2 for therapy) Note – ShamshamaniVati used in trials is an extract of <i>T.cordifolia</i> and MyVir tablets contain <i>T.corifolia</i>
Trial Details	See the table below

Trial ID/Link	Type of Trial	Form used	No. of patients	Drug Combination/ Dose/ Stage of Disease	Primary and Secondary Measures	Has data from the trial been published?
CTRI/2020/04/024731 (Prophylaxis)	Interventional Single arm trial	Herb Extract	50	SamshamaniVati + Sudarshan Ghana Vati+ KhadiradiVati+ MurrchhitaTilaTaila +Aesenic Album Dose: 500 mg twice daily after food with warm water for 15 days of SamshamaniVati Stage: Subjects who are not suffering from active illness	Primary: Episodes and severity of symptoms of respiratory tract infection Secondary: 1. Incidence of COVID 19 infection in study population 2. Requirement of treatment for symptoms developed, during study period 3. Analysis of adverse events	No
CTRI/2020/05/025069 (Prophylaxis)	Interventional Single arm trial	Herb Extract	1324	SamshamaniVati Dose: 500mg Two times Before meal with water for 1 month Stage: High risk individuals	Primary: Incidence of COVID 19 positive cases (as confirmed by hospital by standard investigation (real-time polymerase chain reaction test) among Ayurveda users Secondary: 1) Incidence of severe COVID 19 positive cases among Ayurveda users 2) Incidence of mortality due to COVID 19 among Ayurveda users. 3) Incidence of any other ailment like cough, fever, sore throat etc during this study 4) Change in appetite, bowel habit, sleep 5) ADR/AE due to	No

					use of any particular Ayurveda advocacies	
CTRI/2020/05/02508 8 (Prophylaxis)	Interventional, Randomized, Parallel Group Trial	Herb	1200	Guduchi Dose: 500mg twice daily for one month Stage: Subjects who are from a community where at least 1 confirmed case is already identified	Primary: Comparative assessment of occurrence of COVID-19 infection in healthy volunteers in community having at least 1 confirmed case already identified with control arm of Standard Prophylactic Care Secondary: 1. Comparative assessment of severity of Covid-19 infection in subjects taking Guduchi Tablet and those not taking it in following situations: a) Assessment of subjects not requiring hospitalization b) Severity of symptoms of hospitalized patients in wards c) Patients requiring ICU admission / Ventilator support 2. Global assessment of overall change as per the investigator (Efficacy assessment)	No
CTRI/2020/04/02488 2 (Therapy)	Interventional, Non-randomized, Active Controlled Trial	Herb	60	90-100 ml of kashaya of <i>Tinospora cordifolia</i> stem added with 2gms of finely powdered dried Piperlongum fruit, once in the morning before breakfast and once in the evening before dinner as add on therapy in addition to standard of care medicines Stage: Data not available	Primary: <ul style="list-style-type: none"> Percentage of patients progressing to serious/critical stage of disease Progress of disease as per clinical severity score (COCSS) No. of days of treatment, hospitalisation, No. of days taken to test negative for COVID Secondary: <ul style="list-style-type: none"> No. of days to first clinical symptoms, and what it is No. of days to and of GI symptoms and what they are No. of days of fever and quality of fever (intermittent/remittent, severity, management) 	No

					<ul style="list-style-type: none"> No. of days to Cytokine storm, Severity. No. of days it takes to need ICU management No. of days of oxygen support/ 	
CTRI/2020/05/024967 (Therapy)	Interventional, Single arm trial	Herb Extract	30	MyVir tablet Dose: Orally twice daily after meal for 21days Stage: Data not available	Primary: Improvement in Immunity and anti viral properties in patients who are assessed daily for symptoms which include cough, fever with or without chills and difficulty in breathing for the period they are in quarantine. Secondary: Improvement in the clinical variables including total Leukocyte Count Absolute Leukocyte Count, IL-6 and Hs CRP baseline to end of the quarantine period i.e. 21 days	No

Key Data from Clinical Trials	Data not available
IP Status	<p>Status/ Molecule <i>Tinospora cordifolia</i></p> <p>Approved and Active applications 292257 Title: Formulation for prevention and treatment of bacterial infections and process for preparation thereof Inventor: Shatrughna Prasad Vaidya Filing date: 10/07/2009 Grant date: 30/01/2018 Expected expiry date: 10/07/2029</p> <p>239346 Title: A synergistic antipyretic composition and a process for the preparation thereof Assignee: Council Of Scientific & Industrial Research (National Botanical Research Institute, Lucknow) Filing date: 05/06/2006 Grant date: 16/03/2010 Expected expiry date: 16/03/2030</p> <p>249186 Title: A novel herbal composition effective against coryza and a process for preparing thereof Assignee: Director, Central Council For Research In Unani Medicine Filing date: 25/01/2006 Grant date: 10/10/2011 Expected expiry date: 25/01/2026</p> <p>244043 Title: A composition useful for treatment in chronic respiratory disorders Assignee: Marozhukayil Joseph Jose Filing date: 19/05/2004 Grant date: 16/11/2010</p>

	<p>Pending applications</p> <p>201821003012 Title: Bilayer tablet composition for dengue treatment Assignee: M. C. E. Society's Allana College Of Pharmacy Filing date: 25/01/2018 Status: Published: 26/07/2019</p> <p>201711005894 Title: An antipyretic herbal composition Inventor: Jitendra Awasthi Filing date: 20/02/2017 Status: Published: 24/08/2018</p> <p>1524/CHE/2014 Title: A syrup composition for the treatment of dengue fever Inventor: Ramdas D. Raikar Filing date: 22/03/2014 Status: Published: 31/08/2016</p> <p>2787/CHE/2013 Title: Decoction for quick relief and cure of all types of fever ailments Inventor: Girivas Viswanath Shet Filing date: 26/06/2013 Status: Published: 06/02/2015</p> <p>1632/MUM/2009 Title: Herbal tablet, powder and paste for combustion to treat respiratory tract infections and disorders along blood energizer work by way of its vapour inhalation Inventor: Bharat Manharlal Parikh Filing date: 13/07/2009 Status: Published: 14/10/2011</p> <p>64/KOL/2008 Title: A herbal formulation for the prevention and management of frequent common cold and cough and associated problems Assignee: Ojas Research Centre Pvt. (Ltd) Filing date: 08/01/2008 Status: Published: 10/07/2009</p> <p>141/CHE/2007 Title: Herbal composition to improve the immune response and a method of preparing the same Inventor: ChikkanaNagaraju Filing date: 22/01/2007 Status: Published 28/11/2008</p> <p>3687/DEL/2014 Title: Herbal composition for thrombocytopenia Inventor: Pawan Tiwari Filing Date: 12/12/2014 Status: Published: 23/01/2015</p> <p>540/MUM/2011 Title: Body Revival Assignee: Munir Khan Filing Date: 28/02/2011 Status: Published 21/03/2014</p> <p>201821032952 Title: Homoeopathic compositions and process for preparation of mouth gargling medicine Inventor: Dr. Sonali Rahul Doshi Filing Date: 02/09/2018</p>
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	<p>Expired or Lapsed application or status not known</p> <p>1259/DELNP/2005 Title: A novel immuno-modulatory and anti-allergic herbal formulation Assignee: Council Of Scientific & Industrial Research (National Botanical Research Institute, Lucknow) Filing Date: 31/03/2005 Status: Abandoned under Section 21(1)</p> <p>1068/DEL/2009 Title: A process for the preparation of a composition useful for treatment in cancer, piles chronic respiratory disorders Assignee: Marozhukayil Joseph Jose Filing Date: 25/05/2009 Status: Abandoned under Section 21 (1)</p> <p>1631/MUM/2009 Title: Herbal high-level disinfectant in form of powder, paste and tablet for disinfecting air and surfaces by way of its heated vapour Inventor: Bharat Manharlal Parikh Filing Date: 13/07/2009 Status: Application has been withdrawn</p> <p>220708 Title: A herbo mineral preparation for general immunity and strengthening the body of children Assignee: Central Council For Research in Ayurveda and Siddha Filing Date: 09/12/2003 Status: Patent has Ceased on 02/02/2009</p>
Other references	<p>https://pubmed.ncbi.nlm.nih.gov/28260522/ https://www.sciencedirect.com/science/article/pii/S0048969720317903#f0020</p>

2. Background information

About TFORD-COVID19

The Principal Scientific Advisor to the GoI, Dr K VijayRaghavan, has constituted a S&T Core Group on COVID19. Under the aegis of the S&T Core Group on COVID19, a Task Force has been constituted focused on Repurposing of Drugs for COVID19 (in short “TFORD-COVID19”). The Task Force is being coordinated by Dr V Premnath, Head, NCL Innovations at CSIR-NCL and Director, Venture Center and Dr Anurag Agarwal, Director, CSIR-IGIB. The Nerve Center for the Coordination is located be at Venture Center, Pune (located in the campus of CSIR-NCL).

Credits

Editors: Dr. Priya Nagaraj & Dr Smita Kale; Contributors: Dr. Priya Nagaraj, Dr. Vidula Walimbe, Dr. Smita Kale, Dr. Kirtee Wani, Dr. Tejas Shah, Dr. Swati Joshi, Dr. Manisha Premnath, Dr. Premnath V; Information also contributed by Dr Gopakumar Nair, GNAS and GnanLex.

About Advisory Group

The Nerve Center at TFORD-COVID19 has constituted an inter-disciplinary Advisory Group. This Advisory Group reviews the information compiled by the Nerve Center, provides suggestions on data, information sources, organization of data etc. while also providing inputs to refine the analysis and create a structured information base to support decision-making. The Advisory Group also provides expert input and opinions on certain selected points where experience-based inputs are needed. The members of the Advisory Group for each Discussion Paper are listed at <https://nclinnovations.org/covid19/teams/>.

Disclaimer

This Medicinal Herbal Brief is a compilation of information available openly with no opinions or judgments or recommendations. This document is meant to compile high-quality information that can form the basis for informed discussion and decision-making. It is not meant to reflect the Government’s position or that of any specific organization or individual. This information should also not be interpreted as guidance for clinical case management.