Curriculum Vitae

V.S. Pragadheesh Mobile: +91-9945586503 Bengaluru, India vspragadheesh@cimap.res.in http://vspragadheesh.weebly.com/ orcid.org/0000-0001-8551-0445

I intent to identify, characterize and explore the utility of natural product compounds based on chemical ecology strategies. I am fascinated to employ chromatographic techniques and mass spectrometry for academic and industrial needs.

Recent Media Recognition

"Blooming problem for Jasmine – it smells bad" The Hindu - Business Line, May 04, 2017. (Link)

Our study on "Pollinator Preference across Continents" highlighted in several scientific magazines. (Link)

Research Experience

Scientist CIMAP Research Centre, Bengaluru

(Jan. 2020 to till date) CSIR-Central Institute of Medicinal and Aromatic Plants,

Lucknow, India.

Scientist Organic and Medicinal Chemistry Division (Feb. 2018 to Jan. 2020) CSIR – Indian Institute of Chemical Biology

Kolkata, India

Post-Doctoral Fellow National Centre for Biological Sciences (TIFR)

(Feb. 2015 to Mar. 2017) Bangalore, India.

Ph.D Academy of Scientific and Innovative Research

(Jan. 2012 to Feb. 2015) CSIR – CIMAP, Lucknow, India.

Title: Gas Chromatography Based Enantiomeric Analysis, Isolation and Characterization of

Terpenoids in Essential Oils

Mentor: Dr. Chandan S Chanotiya (CSIR-CIMAP)

Research Fellow Laboratory of Aromatic Plants and Chiral Separation

(Jan. 2010 to Sep. 2014) Analytical Chemistry

CSIR-Central Institute of Medicinal and Aromatic Plants,

Lucknow, India.

Industrial Employment

Officer (R&D) R&D - Technical Development

(Jul. 2008 to Jan. 2010) BASF Coatings India (Pvt) Ltd, Mangalore, India.

Industrial project (Summer Project)

Title Separation of Regioners by Column Chromatography -

Extrapolating and Exploiting TLC Conditions

Organization Research and Development Lab,

BASF India Ltd, Navi Mumbai, India.

Academic History

M.Sc Chemistry	2008	Guru Nanak College, University of Madras, Chennai.
B.Sc Chemistry	2006	Jamal Mohamed College, Bharathidasan University, Trichy.
Schooling	2003	S.S.V. Matric. Hr. Sec. School, Sivagiri, Erode.

Analytical Experience and Training

- Experience in Central Instrument Facility of CSIR-CIMAP, Lucknow and Chemical Ecology Instrument facility in NCBS, Bangalore.
- Experience in operation, trouble-shooting and installation of different analytical techniques like GC, GC-MS, HPLC, LC-MS/MS and FT-IR and interpretation, identification and structural elucidation of chemical compounds.
- ➤ Developed several enantioselective gas chromatographic methods for the resolution of terpenoid enantiomers in the direct analysis of essential oils using different cyclodextrin derivatives as stationary phases.
- ➤ Knowledge in NIST/EPA/NIH and Wiley Registry of Mass Spectral Data; and maintaining own mass spectral data base.
- Experience on the quality assessment of essential oils with Atago Refractometer, KEM Densitometer and Horiba & Anton Paar Polarimeter.

Details of Instruments Handled

S. No	Instrument	Model & Make	Hyphenation	Software
1.	HS-GC	Varian - CP 3800 GC	Combi Pal HeadSpace autosampler	Varian-Star and Varian-Galaxie
2.	GC	Agilent 4890 & 6890 GC	-	HP 3398
3.	GC-MS	Perkin Elmer Autosystem XLGC coupled with Turbomass quadrapole mass spectrometer	Both FID and MS	Total Chrom Navigator and Turbomass
		Shimadzu GC-2010 plus GC equipped with QP2020 GCMS	MS	Lab Solutions- GCMS Solutions
4.	HS-GC-MS	PerkinElmer Clarus 680 GC coupled with Clarus SQ 8 C mass spectrometer (Both EI and CI mode)	Turbomatrix HS 40 Headspace sampler	Turbomass and Turbomatrix HS Control
5.	TD-GC/MS- EAD	Gerstel Thermal Desorption Unit on Agilent 7890B GC system with 5977A MSD(Both EI and CI mode)	Electroantennograp hy (Syntech IDAC- 4)	MassHunter and Maestro
6.	HPLC	Waters HPLC with PDA & ELS detector Shimadzu HPLC with PDA	-	Empower LabSolutions
		Detector		Laboolddollo
7.	LC-MS/MS	Applied Biosystems API 3000 LC-MS/MS connected with PerkinElmer LC	-	Analyst
8.	Spectroscopy	Perkin Elmer Spectrum BX FT-IRand Spectronic Genesis UV Spectrometer	-	Spectrum(FT-IR)

Volatile Sampling techniques

SPME – Solid-Phase Microextraction, HS - headspace, SPE - solid phase extraction (PDMS, Porapak), SE - solvent extraction and TD – thermal desorption.

Publications (28)

M Sam Arul Raj, VP Santhi, S Amalraj, R Murugan, P Gangapriya, **VS Pragadheesh**, V Sundaresan, SS Gurav, P Paramaguru, R Arulmozhian, M Ayyanar (2023) A comparative analysis of leaf essential oil profile, in vitro biological properties and in silico studies of four Indian Guava (*Psidium guajava* L.) cultivars, a promising source of functional food. **South African Journal of Botany**. 153, 357-369.

K Subaharan, PS Selvan, TM Subramanya, R Senthoorraja, S Manjunath, T Das, **VS Pragadheesh**, N Bakthavatsalam, MG Mohan, S Senthil-Nathan, S Uragayala, PP Samuel, R Govindarajan, M Eswaramoorthy (2022) Ultrasound-assisted nanoemulsion of *Trachyspermum ammi* essential oil and its constituent thymol on toxicity and biochemical aspect of *Aedes aegypti*. **Environmental Science and Pollution Research**, 29(47), 71326-71337.

Yogendra N D, Nazeer M, Eresha, Manoj Kumar Yadav, K Baskaran, **VS Pragadheesh**, Jnanesha A C and KVN Satya Srinivas (2022) Comparative morphological assessment of Lemongrass (*Cymbopogon* spp.) cultivars for oil yield, chemical composition and quality parameters under southern region of India. **Madras Agricultural Journal**, DOI: 10.29321/MAJ.10.000561

V Rodrigues, A Kumar, KN Prabhu, **VS Pragadheesh**, A K Shukla, V Sundaresan (2021) Adventitious root cultures of *Decalepis salicifolia* for the production of 2-hydroxy-4-methoxybenzaldehyde, a vanillin isomer flavor metabolite. **Appl. Microbiol. Biotechnol.**

P Darshani, V Sundaresan, **VS Pragadheesh** (2023) Chemical composition and chiral analysis of β-myrcene rich essential oil from *Glossocardia bosvallia* (L.f.) DC. **Natural Product Research**. 37 (3), 498-501.

R Senthoorraja, K Subaharan, S Manjunath, **VS Pragadheesh**, N Bakthavatsalam, MG Mohan, S Senthil-Nathan, S Basavarajappa (2021) Electrophysiological, behavioural and biochemical effect of *Ocimum basilicum* oil and its constituents methyl chavicol and linalool on *Musca domestica* L. Environmental Science and Pollution Research. 28, 50565–50578.

Priyanka Y, D Shukla, AK Srivastava, **VS Pragadheesh**, Deepak Kumar (2021) Purification and identification of anticancer organosulfides from *Ferula assa-foetida* gum: integrative analysis employing GC/GC-MS/RP-HPLC/NMR. **Natural Product Research**. 36 (11), 2869-2874

K Subaharan, R Senthoorraja, S Manjunath, Geetha G T, **VS Pragadheesh**, N Bakthavatsalam, MG Mohan, S Senthil-Nathan, KJ David, S Basavarajappa, C Ballal (2021). Toxicity, behavioural and biochemical effect of *Piper bet*le L. essential oil and its constituents against housefly, *Musca domestica* L. **Pesticide Biochemistry and Physiology**. 174, 104804

CS Chanotiya, **VS Pragadheesh**, A Yadav, P Gupta, RK Lal (2020) Cyclodextrin-based Gas Chromatography and GC/MS methods for determination of chiral pair constituents in mint essential oils **Journal of Essential Oil Research**. 33 (1), 23-31

- V Dwivedi, S Rao, DP Bomzan, S Rajeev Kumar, VS Pragadheesh, S Olsson, DA Nagegowda (2020). Functional characterization of a defense-responsive bulnesol/elemol synthase from potato. Physiologia Plantarum. 171 (1), 7-21
- G NareshBabu, Priyadarshani, Thasmeer PP, **VS Pragadheesh** (2022). Chemical composition of a volatile fraction from the leaves of *Clerodendrum infortunatum* L. **Natural Product Research**. 36(3), 853-856.
- VS Pragadheesh, D Bisht, CS Chanotiya (2020). Terpenoids from Essential Oils. <u>Kirk-Othmer Encyclopedia of Chemical Technology</u>. Accepted, DOI: 10.1002/0471238961.koe00056
- **VS Pragadheesh**, A Yadav, CS Chanotiya (2020). Chiral differentiation of terpenoids in bergamot mint (*Mentha citrata*) cultivar Kiran: A non-menthol mint essential oil. **Journal of Medicinal and Aromatic Plant Sciences**.42(1-2), 138-144.
- A Saroj, CS Chanotiya, R Maurya, **VS Pragadheesh**, A Yadav, A Samad (2019) Antifungal action of *Lippia alba* essential oil in *Rhizoctonia solani* disease management, **SN Applied Sciences**, 1:1144.
- Jyothi V Nair, **VS Pragadheesh**, SD Karpe, U Ramakrishnan, SOlsson (2018) An optimized protocol for large- scale in situ sampling and analysis of volatile organic compounds, **Ecology and Evolution**, 8, 5924-5936.
- K Nordström, J Dahlbom, **VS Pragadheesh**, S Ghosh, A Olsson, O Dyakova, S Krishna, S Olsson (2017) *In situ*modeling of multimodal floral cues attracting wild pollinators across environments, **Proceedings of the National Academy of Sciences of the USA**, 114 (50), 13218-13223.
- **VS Pragadheesh**, CS Chanotiya, SRastogi, AK Shasany (2017). Scent from *Jasminum grandiflorum* flowers: Investigation of the change in linalool enantiomers at various developmental stages using chemical and molecular methods, **Phytochemistry** 140, 83-94.
- **VS Pragadheesh**, A Saroj, R Maurya, A Yadav, N Gupta, ASamad, CS Chanotiya (2017) Enantioselective GC analysis of C₃–oxygenated *p*-menthane type Indian *Mentha spicata* L. var. viridis 'Ganga' essential oil, **Natural Product Communications**, 12(3), 427-430.
- **VS Pragadheesh**, Anju Yadav, CS Chanotiya (2015). Role of substituents in cyclodextrin derivatives for enantioselective gas chromatographic separation of chiral terpenoids in the essential oils of *Mentha spicata*. **Journal of Chromatography B**, 1002, 30-41.
- Arvind Saroj, **VS Pragadheesh**, M Palanivelu, Anju Yadav, A Samad, CS Chanotiya. (2015). Anti-phytopathogenic activity of *Syzygium cumini* essential oil, hydrocarbon fractions and its novel constituents. **Industrial Crops and Products**, 74, 327-335.
- **VS Pragadheesh**, Anju Yadav and CS Chanotiya (2015). Enantiomer differentiation of key volatile constituents from leaves, stems, rhizome and flowers of *Hedychium coronarium* Koenig from India. **Journal of Essential Oil Research**, 27(2) 101-106.

VS Pragadheesh, Arvind Saroj, Anju Yadav, CS Chanotiya, A Samad (2013) Compositions, enantiomer characterization and antifungal activity of two *Ocimum* essential oils. **Industrial Crops and Products**, 50, 333-337.

VS Pragadheesh, ArvindSaroj, AnjuYadav, CS Chanotiya, M Alam, A Samad (2013) Chemical characterization and antifungal activity of *Cinnamomum camphora* essential oil. **Industrial Crops and Products**, 49, 628-633.

VS Pragadheesh, A Yadav, M Singh, CS Chanotiya (2013) Characterization of volatile components of *Zingiber roseum* essential oil using capillary GC on modified cyclodextrins. **Natural Product Communications**, 8(2), 221-224.

VS Pragadheesh, A Yadav, SC Singh, N Gupta, CS Chanotiya (2013) Leaf essential oil of cultivated *Pimenta racemosa* (Mill.) JW Moore from North India: Distribution of phenylpropanoids and chiral terpenoids. **Medicinal and Aromatic Plants**, 2 (118), 2167-0412.100011

Neharica Gupta, N Manika, Suman Singh, SC Singh, **VS Pragadheesh**, Anju Yadav, CS Chanotiya (2012). Investigation on phenylpropanoids rich *Melaleuca decora* (Salisb.) Britt. essential oil. **Natural Product Research**, 26(20), 1945-1947.

A Prasad, **VS Pragadheesh**, A Mathur, NK Srivastava, Manju Singh, AK Mathur (2012). Growth and centelloside production in hydroponically established medicinal plant-*Centella asiatica* (L.). <u>Industrial Crops and Products</u>, 35(1), 309-312.

VS Pragadheesh, AnjuYadav, CS Chanotiya, PK Rout, GC Uniyal (2011). Monitoring the emission of volatile organic compounds from flowers of *Jasminum sambac* using Solid-Phase Microextraction fibers and gas chromatography with mass spectrometry detection. **Natural Product Communications**, 6(9), 1333-1338.

Book Chapter

Furkan Ahmad, **VS Pragadheesh** (2019). High-Throughput Analytical Techniques to Screen Plant Transgenics in 'Advances in Plant Transgenics: Methods and Applications', Springer Singapore

Rudra Prakash Mohanty, **VS Pragadheesh**. (2021) Analytical Techniques for the Qualitative and Quantitative Analysis of Secondary Metabolites from Medicinal and Aromatic Plants in 'Studies In Medicinal And Aromatic Crops' Rubicon Publications, London

Priya Darshani, Md Tanjim Alam, Prem P Tripathi, **VS Pragadheesh**. (2022) Natural Product Compounds from Plants in Neurodegenerative Diseases in 'Medicinal Plants in Global Human Health and Disease' Taylor & Francis, UK

Application Note

CS Chanotiya, **VS Pragadheesh**, GC Uniyal.(2013) Avoiding interferences and contaminants using Eppendorf Safe-Lock Tubes in mass spectrometry studies of natural products. Eppendorf 282, 1-6.

Paper presentation (Oral)

Chiral separation of enantiomers in essential oils by chiral-GC-FID and chiral-GC-MS: Peppermint (M. piperita) and Spearmint (M. spicata) cultivars from India.

VS Pragadheesh, CS Chanotiya, AnjuYadav. Dec. 4-7, 2013, 50th Annual Convention of Chemists, Department of Chemistry, Panjab University, Chandigarh.

Terpenoid diversity in Artemisia annua.

VS Pragadheesh, R Maurya, A Yadav, CS Chanotiya, Dec. 13-14, JIGYASA-2014, CSIR – Central Institute of Medicinal and Aromatic Plants, Lucknow.

Poster Presentation

In-vivo Solid-phase Microextraction (SPME): Nondestructive sampling technique for the living flower systems.

VS Pragadheesh, AYadav, CS Chanotiya. 80th Society of Biological Chemists (India), Nov. 12-15, 2011, CSIR-CIMAP, Lucknow, India.

Possible role of essential for the management of fungal diseases in MAPs.

A Saroj, **VS Pragadheesh**, CS Chanotiya, AKhaliq, AYadav, A Samad. National conference on microbes promoting crop health, productivity & sustainability, Oct. 26-27, 2013, CSIR-CIMAP & CSIR-NBRI, Lucknow India.

Essential oil misbranding or natural variability in chiral constituents and application of enantioselective gas chromatography in their authentication.

CS Chanotiya, **VS Pragadheesh**, Anju Yadav., March 08-09, 2014, National Convention and Interactive Seminar on "Levaraging Aromatic and Medicinal Plants and Products (LAMP-2014) by Medicinal and Aromatic Plants Society of India, CSIR-CIMAP, Lucknow.

Enantioselective gas chromatography – An imperative tool for the analysis of semiochemicals

VS Pragadheesh., Feb. 16-27, 2015, NCBS-TIFR, Bangalore.

Linalool: Signalling compound across kingdoms

VS Pragadheesh, Shannon B Olsson. Postdoc Research Symposium, Oct. 10, 2015, NCBS-TIFR, Bangalore.

What is a flower? Climate, geography and chemo-visual ecology of Hoverfly pollination **VS Pragadheesh,** SuhridSGhosh,BhavyaDharmaraj, JosefinDahlbom, Karin Nordström, Shannon B Olsson. Annual Talks-NCBS, Jan. 11-13, 2016, NCBS-TIFR, Bangalore.

Chemo-visual Flower Preference of Alternative Pollinators incorporating TDU-GC/MS-EAD

VS Pragadheesh, Suhrid Ghosh, Josefin Dahlbom, Karin Nordstrom, Shannon B Olsson. "Olfaction: sampling methods, GC-MS profiling and statistical analysis" April 5-6, 2016.Max Planck Institute of Evolutionary Anthropology and University of Leipzig, Leipzig, Germany.

Workshops - Attended

Workshop on "Olfaction: sampling methods, GC-MS profiling and statistical analysis" April 5-6, 2016. Max Planck Institute of Evolutionary Anthropology and University of Leipzig, Leipzig, Germany.

KS Krishnan School for Chemical Ecology, Feb. 16-27, 2015, National Centre for Biological Sciences (TIFR) Bangalore.

"Training of Master Trainers" under CSIR-Integrated Skill Initiative, 05-09, March, 2018, CSIR-Central Leather Research Institute, Chennai, India

Workshops - As a Resource Person - 7 nos.

Meeting

Renewing the tradition of natural product research in India, A Brain-Storming meeting. Jan. 21-23, 2016, CSIR-Central Drug Research India, Lucknow

Outreach Activities

Seminar Organised

Lecture series in advanced biology – Microbiome and animal behaviour, Jan 29 to Mar 19, 2017. National Centre for Biological Sciences – TIFR, Bangalore.

Popular talks

"Floral Scent: Pollinator Attractant or Herbivore Deterrent?" at 'JIGYASA' 2018: A Summer Research Program for "Kendriya Vidyalaya Students" organized by CSIR-Indian Institute of Chemical Biology, Kolkata during Apr. 24 - 26, 2018.

Popular Article

"The Scent Orchestra of Flowers" VS Pragadheesh, Shannon Olsson, published in 'I Wonder' Magazine of AzimPremji Foundation Focusing middle school teachers in Nov. 2018 issue.

Invited Lecture

"Medicinal and Ecological Aspects of Aromatic Plants" at a national seminar on 'Current Research in Medicinal Plants – Global Trends and Indian Scenario' organized by Durgapur Vishwagandha Science Society in association with Dr. B.C. Roy College of Pharmacy and Allied Health Sciences, Durgapur during Mar. 28-29, 2019

Awards and Merits

- ➤ University level III rank in B.Sc Chemistry from Bharathidasan University, Thiruchirapalli-20.
- > Dr. P. Balasubramaniam Award for proficiency in B.Sc Chemistry
- ➤ Dr. K. A. BasheerAhamed Award for First rank in B.Sc Chemistry of Jamal Mohamed College for the year 2006.
- ➤ Outstanding Research Publication award for the year 2017 at CSIR-Central Institute of Medicinal and Aromatic Plants, Lucknow, India, March 2018
- Reviewer for research manuscripts in natural product research journals.

Research Guidance

PhD : Ongoing - 2

Masters : Ongoing - 2 Completed - 4

Personal Details

Father and Mother : V.P.Shanmugam and V.S.Shakunthalai

Date of birth / Age :02-09-1985 / 36

Sex :Male Nationality :Indian

Languages Known :Tamil, English, and Hindi Permanent Address :14-Panapalayathar Veedu, VadakkuPudhuPalayam (PO) Kodumudi, Erode (DT) Tamil Nadu – 638152, India.