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2. **Employee ID:** 570

3. **Designation:** Principal Scientist

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7. **Divisional Unit Name:** Phytochemistry

8. **Area of Specialization**

Dr. Ram Swaroop's lab is working on chemical profiling and quality evaluation of the essential oils of Aromatic Plants. He is involved in the study of the essential oil composition of commercially important Aromatic Crops, underutilized aromatic plants in the wild, and chemotype variants. He is also involved in the process development for the isolation of high-value phytomolecules and standardizing of essential oil quality of economically important aromatic plants through assessing intraspecific, seasonal, ontogenic, endogenous, and storage variations. He has more than 18 years of research experience in the field of chemical characterization and quality assessment of the essential oils of Aromatic Plants.

9. **Qualifications**

- M.Sc. in Chemistry in 2000 at Dr. Ram Manohar Lohia Avadh University, Ayodhya, U.P.
- Ph.D. in Chemistry in 2020 at Kumaun University Nainital, Uttarakhand.

10. **Academic/Research Experience**

- Junior Scientist at CSIR-CIMAP from 03 June 2005 to 02 June 2008
- Scientist at CSIR-CIMAP from 03 June 2008 to 02 June 2013
- Senior Scientist at CSIR-CIMAP from 03 June 2013 to 02 June 2017
- Principal Scientist at CSIR-CIMAP from 03 June 2017 to date
- Associate Professor (Honorary) at the Academy of Scientific and Innovative Research (AcSIR) in the Faculty of Chemical Sciences from 03 June 2017 to till date.

11. **Honours & Awards**

- 2022: Top 2% Scientists Database: Featured in the Top 2% list of influential researchers worldwide for 2022. The study conducted by Stanford University, Stanford CA, USA
- 2021: Top 2% Scientists Database: Featured in the list of the world's Top 2% Scientists database 2021 released by Elsevier BV based on a study conducted by Stanford University, USA
- 2021: Editor: Journal of Medicinal and Aromatic Plants (JMAPS)
- 2017: Editorial Board Member: American Journal of Essential Oils and Natural Products
- 2011: Editorial Board Member: Medicinal & Aromatic Plants
- Member of the Essential Oil Association of India (EOAI)
- Member of the Society for Ethnopharmacology, Kolkata, India (SFE-INDIA)
- Member of the Flora Fauna Science Foundation (FFSF)



12. Research Publications

- Bhatt D, Singh S, Singh MK, Maurya AK, Chauhan A, Padalia RC, Verma RS, Dnyaneshwar U. Bawankule. 2023. Acyclic monoterpenoid-rich essential oil of *Cymbopogon distans* mitigates skin inflammation: a chemico-pharmacological study. *Inflammopharmacology*, <https://doi.org/10.1007/s10787-023-01302-0>
- Venkatesha KT, Verma PPS, Padalia RC, Verma RS, Jhang T, Upadhyay RK, Kumar D, Singh VR, Kumar S, Chanotiya CS, Chauhan A, Tiwari AK, Singh S, Kumari M, Gupta A, Kholiya S, Singh MK. 2022. CIM-Sudeeksha: A high herb-yielding and carvacrol-rich clone of Indian Oregano (*Origanum vulgare* L.). *Journal of Medicinal and Aromatic Plant Sciences* 44(3-4), 135-141.
- Yogendra ND, Keerth PE, Nazeer M, Jnanesha AC, Verma RS, Sundaresan V. 2023. Livelihood enhancement and resource use efficiency under lemongrass intercropping with food crops. *Acta Ecologica Sinica*, <https://doi.org/10.1016/j.chnaes.2023.06.001>
- Jhang T, Lal RK, Pandey P, Saroj P, Agrawal S, Dwivedi S, Lal K, Srivastav AJ, Kumari M, Chanotiya CS, Verma RS, Tandon S, Yadav A, Kumar JK, Jnanesha AC, Kumar A, Singh AK. 2022. Registration of CIM-Vrinda: A citral (Neral and Geranial) rich high essential oil yielding variety of *Ocimum basilicum* L. *Journal of Medicinal and Aromatic Plant Sciences* 44(3-4), 127-134.
- Nooreen Z, Siddiqui NA, Wal P, Shukla A, Verma RS, Ahmad A, Tandon S, Alkahtani S, Alkahtane AA, Mohammad A. 2023. Evaluation of *Cuscuta reflexa* seed essential oil on TPA induced inflammation in mice. *Journal of King Saud University-Science*, doi: <https://doi.org/10.1016/j.jksus.2023.102711>
- Singh MK, Savita K, Singh S, Mishra D, Rani P, Chanda D, Verma RS. 2023. Vasorelaxant property of 2-phenyl ethyl alcohol isolated from the spent floral distillate of damask rose (*Rosa damascena* Mill.) and its possible mechanism. *Journal of Ethnopharmacology*, 116603.
- Tiwari G, Chaturvedi T, Gupta AK, Lal RK, Verma RS, Srivastava RK, Singh P, Gangwar B, Darokar MP, Dhawan SS. 2023. Assessment of genetic diversity, micromorphology and antimicrobial activity in *Nepeta cataria* L. *Chemistry & Biodiversity*, 20, 2, e202200241.
- Channayya H, Baskaran K, Sundaresan V, Nagegowda DA, Verma RS, Satyasrinivas KVN, Kumar N, Pragadheesh VS, Singh S, Kalra A. 2022. Development of high-oil and high citronellal *Eucalyptus citriodora* clone CIM-NANDI. *Journal of Medicinal and Aromatic Plant Sciences*, 44(1-2), 66-71.
- Gowda MRS, Hirtemath C, Singh S, Verma RS. 2022. The influence of NaCl salt stress on the yield and quality of the essential oil from two varieties of rose-scented geranium (*Pelargonium graveleons* L'H'er.). *Biochemical Systematic and Ecology*, 105, 104532.
- Kashyap PK, Singh S, Singh MK, Gupta A, Tandon S, Shanker K, Verma RK, Verma RS. 2022. An efficient process for the extraction of lutein and chemical characterization of other organic volatiles from marigold (*Tagetes erecta* L.) flower. *Food Chemistry*, 396, 133647.
- Upadhyay R, Lothe NB, Bawitlung L, Singh S, Singh MK, Kumar P, Verma RK, Tandon S, Pal A, Verma RS. 2022. Secondary metabolic profile of rose-scented geranium: A tool for characterization, distinction and quality control of Indian genotypes. *Industrial Crops and Products*, 187, Part B, 115487.
- Singh S, Kurmi A, Gowda MRS, Singh MK, Hiremath C, Sundaresan V, Tandon S, Padalia RC, Verma RK, Saikia D, Verma RS. 2022. Chemical investigation, quality assessment, and antimicrobial activity of davana (*Artemisia pallens* Wall. ex DC) essential oil collected from different locations in India. *Journal of Essential Oil Research*, 34(4), 290-302.
- Trivedi M, Singh S, Pandey T, Gupta SK, Verma RS, Pandey R. 2022. Sesquiterpenoids isolated from davana (*Artemisia pallens* Wall. ex DC) mitigates parkinsonism in *Caenorhabditis elegans* disease model. *Biochemical and Biophysical Research Communications*, 609, 15-22.

- Agarwal K, Sinha S, Parmanand, Mina PR, Verma SC, Verma RS, Tandon S, Pal A, Darokar MP, Gupta A. 2022. In vivo efficacy, mechanistic study and synergistic interaction of Precocene II with Norfloxacin against methicillin-resistant *Staphylococcus aureus*. *Chemistry & Biodiversity*, 19, e202100906.
- Singh S, Bhatt D, Singh MK, Maurya AK, Monazza Israr KM, Chauhan A, Padalia RC, Verma RS, Bawankule DU. 2022. p-Menthadienols-rich essential oil from *Cymbopogon martini* ameliorates skin inflammation. *Inflammopharmacology*, 30(3), 895-905.
- Singh S, Bawitlung L, Singh MK, Chauhan A, Padalia RC, Pal A, Verma RS. 2022. Chemical composition of essential oil from *Pilea microphylla* and its antimicrobial activity. *Chemistry of Natural Compounds*, 58(1), 161-162.
- Singh S, Bhatt D, Singh MK, Sundaresan V, Tandon S, Padalia RC, Bawankule DU, Verma RS. 2021. New insights into the chemical composition, pro-inflammatory cytokine inhibition profile of davana (*Artemisia pallens* Wall. ex DC.) essential oil and cis-davanone in primary macrophage cells. *Chemistry & Biodiversity*, 18(11), e2100531.
- Singh S, Kurmi A, Singh MK, Kashyap PK, Tandon S, Chauhan A, Padalia RC, Saikia D, Verma RS. 2021. Chemical composition and antimicrobial activity of the leaf essential oil of *Ravenia spectabilis* Engl. (Rutaceae). *Natural Product Research*, 36(17):4439-4442.
- Srivastava A, Gupta S, Singh S, Verma RS, Srivastava RK, Gupta AK, Lal RK. 2021. Genetic variability and elite line selection for high essential oil and nepetalactone content in catmint (*Nepeta cataria* L.). *American Journal of Plant Sciences*, 12, 1135-1154.
- Kumar A, Bhatt G, Pandey P, Chauhan A, Upadhyay RK, Saikia D, Verma RS, Chanotiya CS, Padalia RC. 2021. Chemical characterization, antimicrobial and antioxidant evaluation of *Cymbopogon jwarancusa* (Jones) Schult. essential oil. *Journal of Essential Oil Research*, 33(4), 351-358.
- Padalia RC, Upadhyay RK, Chauhan A, Singh VR, Verma RS, Chanotiya CS. 2021. Influence of harvesting frequency on essential oil yield and composition of geraniol-rich cultivar of *Cymbopogon flexuosus* L. *National Academy Science Letters*, 44, 383–388.
- Bhatt G, Nagarkoti RS, Kholiya S, Tiwari A, Verma SK, Verma RS, Darokar MP, Padalia RC. 2021. Chemical and antibacterial activity evaluation of *Alpinia calcarata* and *Alpinia zerumbet* grown in foothills agroclimatic conditions of Northern India. *The Open Bioactive Compounds Journal*, 9, 15-19.
- Kumar V, Singh VR, Singh N, Yadav R, Singh MK, Verma RS, Padalia RC, Lal RK. 2021. Quantification of variability, character associations, and contribution in Indian landraces of Bishop's Weed (*Ammi visnaga* (L.) Lam). *Journal of Essential Oil Bearing Plants*, 24, 1-12.
- Prasad P, Singh V, Aftab N, Gupta A, Kishor R, Kushwaha HK, Singh V, Verma RS, Kumar B. 2021. Gamma irradiation-induced variability in morpho-agronomic and oil quality traits of *Mentha piperita* L. *International Journal of Radiation Biology*, 97(5):737-745.
- Lothe NB, Mazeed A, Pandey J, Patariya V, Verma K, Semwal M, Verma RS, Verma RK. 2021. Maximizing yields and economics by supplementing additional nutrients for commercially grown menthol mint (*Mentha arvensis* L.) cultivars. *Industrial Crops & Products*, 160, 113110.
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- Bhatt G, Tiwari AK, Venkatesha KT, Upadhyay RK, Chauhan A, Verma RS, Singh VR, Padalia RC. 2020. Harvest and post-harvest studies on *Mentha arvensis* var. *CIM-Kranti* for quality essential oil production in winter and summer cropping seasons. *Journal of Medicinal and Aromatic Plant Sciences*, 42(1-2), 114-120.

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- Gokul S, Rodrigues V, Kumar A, Verma RS, Shukla AK, Sundaresan V. 2020. Population genetics coupled chemical profiling for conservation implications of *Decalepis salicifolia* (Bedd. ex Hook.f.), an endemic and critically endangered species of Western Ghats, India. *Biochemical Genetics*, 58(3), 452-472.
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- Verma RS, Padalia RC, Chauhan A, Upadhyay RK, Singh VR. 2020. Productivity and essential oil composition of rosemary (*Rosmarinus officinalis* L.) harvested at different growth stages under the subtropical region of north India. *Journal of Essential Oil Research*, 32(2), 144-149.
- Kumar A, Kamal A, Singh S, Padalia RC, Tandon S, Chauhan A, Saikia D, Verma RS. 2020. Chemical composition, antimicrobial activity, kinetics and mechanism of action of Himalayan-thyme (*Thymus linearis* Benth.). *Journal of Essential Oil Research*, 32(1), 64-73.
- Singh N, Singh VR, Lal RK, Verma RS, Mishra A, Yadav R. 2019. Quantification of genotypic and chemotypic diversity for elite clone selection with high-quality essential oil traits in Vetiver [*Chrysopogon zizanioides* (L.) Roberty]. *Journal of Essential Oil Bearing Plants*, 22:4, 1150-1162.
- Singh VR, Lal RK, Chanotiya CS, Dhawan SS, Gupta P, Srivastava S, Singh N, Upadhyay RK, Padalia RC, Verma RS, Venkatesha KT, Singh S, Verma RK, Tandon S, Kumar S, Kumar B, Nannaware AD, Chauhan A, Chandra R, Chaturvedi T, Kumar V, Yadav A, Maurya R, Shukla S, Mishra A, Singh S. 2019. CIM-Utkrisht: A high essential oil yielding variety of patchouli (*Pogostemon cablin* (Blanco) Benth) with a unique aroma suitable for cultivation under North Indian conditions. *Journal of Medicinal and Aromatic Plant Sciences*, 41(1-4), 79-85.
- Verma RS, Singh S, Padalia RC, Tandon S, Venkatesh KT, Chauhan A. 2019. Essential oil composition of the sub-aerial parts of eight species of *Cymbopogon* (Poaceae). *Industrial Crops and Products*, 142, 111839.
- Kumar A, Mishra P, Rodrigues V, Baskaran K, Verma RS, Padalia RC, Sundaresan V. 2019. Delineation of *Ocimum gratissimum* L. complex combining morphological, molecular and essential oils analysis. *Industrial Crops & Products*, 139, 111536.
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- Pankaj U, Verma RS, Yadav A, Verma RK. 2019. Effect of arbuscular mycorrhizae species on essential oil yield and chemical composition of palmarosa (*Cymbopogon martinii*) varieties grown under salinity stress soil. *Journal of Essential Oil Research*, 31(2), 145-453.
- Chauhan A, Venkatesha KT, Padalia RC, Singh VR, Verma RS, Chandan CS. 2018. Essential oil composition of leaves and inflorescences of *Elsholtzia densa* Benth. from western Himalaya. *Journal of Essential Oil Research*, 31(3), 217-222.
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- Venkatesha KT, Singh VR, Spoorthi V, Padalia RC, Verma RS, Upadhyay RK, Chauhan A. 2018. Genetic variability, genetic diversity, association and path analysis for economic traits in indian oregano (*Origanum vulgare* L.). *International Journal of Agriculture Sciences*, 10(12), 6417-6421.
- Chaturvedi T, Kumar A, Kumar A, Verma RS, Padalia RC, Sundaresan V, Chauhan A, Saikia D, Singh VR, Venkatesha KT. 2018. Chemical composition, genetic diversity, antibacterial, antifungal and antioxidant activities of camphor-basil (*Ocimum kilimandscharicum* Guerke). *Industrial Crops and Products*, 118, 246–258.
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- Padalia RC, Verma RS, Chauhan A, Goswami P, Singh VR, Verma SK, Singh N, Kurmi A, Darokar MP, Saikia D. 2018. p-Menthenols chemotype of *Cymbopogon distans* from India: composition, antibacterial and antifungal activity of the essential oil against pathogens. *Journal of Essential Oil Research*, 30(1), 40-46.
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13. Review Articles

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14. Book Chapters

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15. Patents

- A process for the preparation of vanillin and other substituted phenylaldehydes. 2021. (India: 202011028345 and PCT: PCT/IN2021/050495). Gupta A, Verma RS, Singh S, Singh S, Negi AS, Shanker K, Tandon S, Kalra A.

16. Varieties

Contributed as a team member in the development of the following Aromatic Plant varieties:

- **CIM-Suras:** A menthol-rich, sucker-producing, and high-yielding peppermint (*Mentha piperita* L.) variety
- **CIM-Bharat:** A high-yielding and novel chemotype of rose-scented geranium (*Pelargonium graveolens* L.' Herit. ex Aiton)
- **CIM-Krishnapriya:** High oil-yielding lemongrass (*Cymbopogon flexuosus*) variety
- **CIM-Sudeeksha:** A high herb-yielding clone of Indian oregano (*Origanum vulgare* L.)
- **CIM-Vrinda:** Citral rich high essential oil yielding advanced breeding line of *Ocimum basilicum* L.
- Development of high-oil and high-citronellal *Eucalyptus citriodora* clone **CIM-Nandi**
- A new essential oil-rich variety **CIM-Unnati** of Menthol-mint (*Mentha arvensis*)
- A Thymol rich (45-50 %) var. **CIM-Akshay** of *Ocimum gratissimum*
- A linalool-rich (73.9%) var. **CIM-Sukhda** of Basil (*Ocimum basilicum* x *Ocimum africanum*).
- **CIM-Mohak**-An interspecific spearmint (*Mentha spicata* L.) hybrid with a unique aroma.
- (2Z,8Z)-Matricaria acid methyl ester rich variety '**CIM-Ujjwala**' of chamomile (*Matricaria chamomilla* L.).
- **CIM-Utkrisht:** A high essential oil-yielding variety of Patchouli (*Pogostemon cablin*) with a unique aroma suitable for north Indian conditions.
- Registration of pulegone-rich variety '**CIM-Vishisht**' of *Mentha arvensis*
- A high essential oil yielding a variety of rosemary (*Rosmarinus officinalis*) '**CIM-Hariyali**'

17. Technologies developed

- A green process developed for the extraction of Lutein from the marigold flowers. Major solvents used in the process are commercially available and produced from renewable resources.

18. Technologies transferred

19. Research Scholars



Ms. Swati Singh



Mr. Munmun Kumar Singh



Ms. Suyashi Mishra



Mr. Uma Shankar

- Ms. Swati Singh has done work as a Project Associate under Aroma Mission Phase I and Phase II (HCP-0007). Currently, she is pursuing her Ph.D. from AcSIR.
- Mr. Munmun Kumar Singh has done work as a Project Associate under the Cannabis project (GAP-430). Currently, he is pursuing his Ph.D. from AcSIR.
- Ms. Suyashi Mishra is working as a Project Associate under Floriculture Mission Phase II (HCP-0037).
- Mr. Uma Shankar is working as a Project Associate under Aroma Mission Phase III (HCP-0007).

20. Any other information you may want to show

Google Scholar: https://scholar.google.com/citations?hl=en&user=D9wvLnEAAAJ&view_op=list_works

Research Gate Link: https://www.researchgate.net/profile/Ram_Verma3