

Dr. C.S. Vivek Babu

Senior Principal Scientist

Food Protectants & Infestation Control (FPIC) Department.

CSIR-Central Food Technological Research Institute (CSIR-CFTRI)

Mysuru - 570 020, Karnataka, INDIA

E-mail: Vivekbabu.cs@cftri.res.in

Mobile: 9448581704



Area of Work

- Development of novel biorational-fumigants for stored grain insect management.
- Hermetic methods of grain storage for nutritionally important millets.
- Mitigation of Mycotoxins/Aflatoxins in food grains (Maize & Groundnut).
- Seed-endophyte interactions in economically important cereal grains.
- Natural insecticides & Insect proof-packaging for control of stored grain insect pests.

Work Experience

- ❖ Senior Principal Scientist, Food Protectants & Infestation Control (FPIC) Department., CSIR-CFTRI, Mysore [2023 to till date]
- ❖ Principal Scientist, Food Protectants & Infestation Control (FPIC) Department., CSIR-CFTRI, Mysore [2018 to 2023]
- ❖ Senior Scientist (Microbiology), CIMAP Research Center, Bangalore [2012 – 2018]
- ❖ Associate Scientist, ITC Corporate R&D, Bangalore [2008 to 2012]
- ❖ DBT- Post Doctoral Fellow, Indian Institute of Science, Bangalore [2006 to 2008]
- ❖ Research Associate, Shriram Institute for Industrial Research, Bangalore [2005- 2006]
- ❖ Research Scholar, Gulbarga University, Gulbarga [2000 - 2005]

Recognitions in National & State Level Scientific Committees

- ❖ Member of Scientific Panel on Contaminants in the Food Chain (SP-07), constituted by Food Safety and Standards Authority of India (FSSAI), New Delhi. w.e.f. 1st March 2023.
- ❖ Member of Expert Committee to examine various limits of Copper in the Food Commodities, constituted by Food Safety and Standards Authority of India (FSSAI), New Delhi. w.e.f. 16th April 2023.
- ❖ Member of Electronic Working Group (EWG) in Codex Committee on Contaminants in Foods (CCCF-17: Pyrrolizidine Alkaloids) constituted by FSSAI and National Codex Contact Point (NCCP) of India, New Delhi. w.e.f. 18th Aug 2023.
- ❖ Member of Sectional Committee FAD 16-Foodgrains, Allied products, and other agricultural produce constituted by The Bureau of Indian Standards (BIS), New Delhi.
- ❖ Member of Expert Committee of Microbiology, constituted by Karnataka State Higher Education Council, Bangalore to draft model curriculum contents w.e.f. 12th Aug 2022.
- ❖ Nominee of Visvesvaraya Technological University (VTU), Belagavi to the Board of Studies in Biotechnology of RV College of Engineering, Bangalore w.e.f. 2nd Nov 2021.

Awards

- ❖ Recipient of DBT-Post Doctoral Fellowship, Govt of India
- ❖ Recipient of CSIR-Senior Research Fellowship, Govt of India
- ❖ Qualified in GATE - 2004, conducted by MHRD, Govt of India
- ❖ Recipient of Gulbarga University Merit-Research Fellowship
- ❖ Secured Second Rank in M.Sc. (Microbiology)

Educational Qualifications

- ❖ Post- Doctorate: Indian Institute of Science, Bangalore [March 2006 to Feb 2008]
- ❖ Ph.D: Dept. of Microbiology, Gulbarga University; Awarded - 09.01.2006, [Sept 2001-May2005]
- ❖ Pre-Ph.D: Microbiology, Gulbarga University (I class with 75.02%), [2000 -2001]
- ❖ M.Sc: Microbiology, Gulbarga University; Secured II Rank with 75.08%, [1998 - April 2000]
- ❖ B.Sc: Microbiology, KSC Tiptur, Tumkur District, Bangalore University. Secured I Class with 71.83%, [1994 -1997]
- ❖ Pre-University: Kalpataru College, Tiptur, Tumkur District, Secured I Class with 65.3%, [1992 - 1994]
- ❖ Matriculation: Govt. Boys' High School, Tiptur, Tumkur District, Secured I Class with 73.3%, [1991-1992].

Research Projects (Ongoing & Completed)

- 1) **2024-2026:** Principal Investigator; *Development of essential oil based prophylactic agents for prevention of stored grain insect pests*; Funded under CSIR-FTT Scheme.
- 2) **2023-2025:** Principal Investigator; *Shelf life enhancement of millets through non-hermetic, hermetic and advanced methods of storage system*; Funded under CSIR-Millet Mission Scheme – HCP 52.
- 3) **2020- 2023:** Principal Investigator; *Strategies to reduce mycotoxins (fungal secondary metabolites) in cereal grains during storage condition through Seed-Endophyte interactions*; Funded under CSIR-FBR Scheme.
- 4) **2021 – 2023:** Principal Investigator; *Development of Novel hermetic bags [Post-harvest storage bags or Impregnated storage bags]*; Funded under CFTRI-MLP.
- 5) **2022 – 2024:** Co-Principal Investigator; *Disinfestation and management of phosphine resistance insect pests: design and development of multi-fume grain storage system*; Funded under CSIR-FIRST Scheme.
- 6) **2020 – 2023:** Co-Principal Investigator; *Scaling up the bio-fumigation technology for protection of stored food commodities from insect pests*; Funded under CSIR ATLAS MissionMode HCP31.
- 7) **2020- 2023:** Co-Principal Investigator; *Enhancement of curcumin and terpenoid content in Indian varieties of Curcuma longa by endophytes*; Funded under CSIR-FBR Scheme.

Publications

- 1) Patole Reshma Prabhakar, Jeevan Prasad Reddy, P.S. Keshava Murthy, **C.S. Vivek Babu*** (2024). *Feasibility of polylactic acid and essential oil composite with insecticidal properties for prevention of Sitophilus oryzae and Oryzophilus surinamensis in Sorghum and Pearl millet. International Journal of Biological Macromolecules*, Volume 281, Part 1, November 136190. <https://doi.org/10.1016/j.ijbiomac.2024.136190>. *Corresponding Author. **Impact Factor (7.7)**.
- 2) Tabassum, Akhil Babu, Hajeera Sheraz Ahmed, Tanusha Naik, Bhumika K P, D. Jeevan Prasad Reddy, Patole Reshma Prabhakar, **Vivek Babu C S**, Kokkarachedu Varaprasad, P. S. Keshava Murthy (2024). *Development of antibacterial edible films for food packaging using tragacanth gum, carrageenan, and clove essential oil. Journal of Applied Polymer Science*, Available online 27th March 2024, <https://doi.org/10.1002/app.55495>. **Impact Factor (3.0)**.
- 3) Kodape, A. R., Ankita, L., **Vivek Babu C.S*** (2024). *Metagenomic insights of fungal diversity of peanuts under storage conditions and mitigation of aflatoxigenic fungi through competitive exclusion and phytochemicals. Food Bioscience*, Available online 4th February 2024, 103711. <https://doi.org/10.1016/j.fbio.2024.103711>. *Corresponding Author. **Impact Factor (5.2)**.
- 4) Patole Reshma Prabhakar, Jeevan Prasad Reddy, P.S. Keshava Murthy, **C.S. Vivek Babu*** (2023). *Insecticidal property of Ocimum essential oil embedded polylactic acid packaging films for control of Sitophilus oryzae and Callosobruchus chinensis. International Journal of Biological Macromolecules*, Available online 22nd Nov 2023, Volume 256 (2), 128298. <https://doi.org/10.1016/j.ijbiomac.2023.128298>. *Corresponding Author. **Impact Factor (8.2)**.
- 5) Archana V Remesh, Patole Reshma Prabhakar, **C.S. Vivek Babu*** (2023). *Biorational potential of Mentha essential oils of Indian origin: Comparative note on insecticidal efficacy, fumigant persistence, oviposition deterrence of Sitophilus oryzae. Food Bioscience*, Available online 9th July 2023, 102932. <https://doi.org/10.1016/j.fbio.2023.102932>. *Corresponding Author. **Impact Factor (5.2)**.
- 6) K Bincy; Archana V Remesh; Patole Reshma Prabhakar; **Vivek Babu CS*** (2022). *Chemical composition and insecticidal activity of Ocimum basilicum (Lamiaceae) essential oil and its major constituent, estragole, against Sitophilus oryzae (Coleoptera: Curculionidae). Journal of Plant Diseases and Protection*, (Published: 16 December 2022, DOI 10.1007/s41348-022-00695-4) *Corresponding Author. **Impact Factor (2.0)**.
- 7) Bincy K, Archana V Remesh, Patole Reshma Prabhakar, **C.S. Vivek Babu*** (2022). *Differential fumigant and contact biotoxicities of biorational essential oil of Indian sweet basil and its active constituent against pulse beetle, Callosobruchus chinensis. Food Bioscience*, Volume 51, February 2023, 102283; doi: <https://doi.org/10.1016/j.fbio.2022.102283> (Accepted on 2nd Dec 2022). *Corresponding Author. **Impact Factor (5.2)**.
- 8) Remesh A.V., Raveendran A., Bincy K., Wagh V.S., Dastager S.G. and **C.S. Vivek Babu*** (2022). *Insights on biorational potential of Ocimum gratissimum essential oil and its binary combination with monoterpene phenol for control of rice weevil (Sitophilus oryzae) and aflatoxigenic fungi., Food Bioscience*, Volume 50, Part A, December 2022, 102019; doi: <https://doi.org/10.1016/j.fbio.2022.102019>. *Corresponding Author. **Impact Factor (5.2)**.
- 9) Archana V. Remesh and **Vivek Babu C.S*** (2022). *Fumigant and contact toxicities of individual and additive combinations of biorational-essential oils for control of rice weevil (Sitophilus oryzae).*, **Natural Product Research**, Sep 21:1-5. Accepted on 10th September 2022 -

<https://doi.org/10.1080/14786419.2022.2125967>. *Corresponding Author. **Impact Factor (2.488)**.

- 10) Kodape, A. R., Raveendran, A. and **Vivek Babu C.S*** (2022). *Aflatoxins: A Postharvest Associated Challenge and Mitigation Opportunities*. In (Ed.), *Aflatoxins - Occurrence, Detection and Novel Detoxification Strategies* [Working Title]. *Book Chapter Published* on September 22nd 2022. IntechOpen. <https://doi.org/10.5772/intechopen.106333>. *Corresponding Author.
- 11) Mastan A, Rane D, Dastager SG, **Vivek Babu CS*** (2021). Molecular insights of fungal endophyte co-inoculation with *Trichoderma viride* for the augmentation of forskolin biosynthesis in *Coleus forskohlii*. **Phytochemistry**; 184:112654. doi: 10.1016/j.phytochem.2021.112654. Epub 2021 Jan 15. **Impact Factor (3.8)**, *Corresponding Author.
- 12) Umesh Pankaj, Durgesh Narain Singh, Pooja Mishra, Pooja Gaur, **C. S. Vivek Babu**, Karuna Shanker and Rajesh Kumar Verma (2020). *Autochthonous halotolerant plant growth promoting rhizobacteria promote bacoside A yield of Bacopa monnieri (L) Nash and phytoextraction of salt-affected soil*. **Pedosphere**, 2020, 30(5), pp. 671–683, **Impact Factor (5.514)**.
- 13) Mastan A, Vivek Babu CS*, Hiremath C, Srinivas KVNS, Kumar AN, Kumar JK (2020). *Treatments with native Coleus forskohlii endophytes improve fitness and secondary metabolite production of some medicinal and aromatic plants*. **Int Microbiol**. 2020 May;23(2):345-354. doi: 10.1007/s10123-019-00108-x. **Impact Factor (3.1)**, *Corresponding Author.
- 14) Pooja Misra, Deepamala Maji, Ashutosh Awasthi, Shiv Shanker Pandey, Anju Yadav, Alok Pandey, **Vivek Babu CS*** and Alok Kalra* (2019). *Vulnerability of soil microbiome to monocropping of Medicinal and Aromatic Plants and its restoration through intercropping and organic amendments*; **Frontiers in Microbiology** (Accepted: 28 October 2019: Volume 10, Article 2604, doi: 10.3389/fmicb.2019.02604) **Impact Factor (5.2)**, *Corresponding Author.
- 15) Anthati Mastan, Digeshwar Rane, Syed G. Dastager, **C.S. Vivek Babu*** (2019). *Development of low-cost plant probiotic formulations of functional endophytes for sustainable cultivation of Coleus forskohlii*. **Microbiological Research** (Accepted on 3rd Aug 2019). <https://doi.org/10.1016/j.micres.2019.126310>. **Impact Factor (6.7)**, *Corresponding Author.
- 16) Anthati Mastan, Digeshwar Rane, Syed G. Dastager, **C.S. Vivek Babu*** (2019). *Plant Probiotic Bacterial Endophyte, Alcaligenes faecalis, Modulates Plant Growth and Forskolin Biosynthesis in Coleus forskohlii*. **Probiotics and Antimicrobial Proteins**. (Accepted on 29th June 2019). <https://doi.org/10.1007/s12602-019-09582-1>. **Impact Factor (4.9)**, *Corresponding Author.
- 17) Anthati Mastan, RKB Bharadwaj, Ramesh Kumar Kushwaha, **C.S. Vivek Babu***(2019). *Functional fungal endophytes in Coleus forskohlii regulate labdane diterpene biosynthesis for elevated forskolin accumulation in roots*. **Microbial Ecology** (Accepted on 02 April 2019) DOI: 10.1007/s00248-019-01376-w., **Impact Factor (3.6)**, *Corresponding Author.
- 18) Ramesh Kumar Kushwaha, Sucheta Singh, Shiv Shanker Pandey, Alok Kalra, **C.S. Vivek Babu*** (2019). *Fungal endophytes attune withanolide biosynthesis in Withania somnifera, prime to enhanced withanolide A content in leaves and roots*. **World Journal of Microbiology and Biotechnology**; (17th Jan 2019) 35: 20. <https://doi.org/10.1007/s11274-019-2593-1>, **Impact Factor (4.1)**, *Corresponding Author.

- 19) Ramesh Kumar Kushwaha, Sucheta Singh, Shiv Shanker Pandey, Alok Kalra, **C.S. Vivek Babu*** (2019). *Innate endophytic fungus, Aspergillus terreus as biotic elicitor of withanolide A in root cell suspension cultures of Withania somnifera*. **Molecular Biology Reports**; (31st Jan 2019). <https://doi.org/10.1007/s11033-019-04641-w>, pp 1– 14, **Impact Factor (2.8)**, *Corresponding Author.
- 20) Ramesh Kumar Kushwaha, Sucheta Singh, Shiv Shanker Pandey, D.K. Venkata Rao, Dinesh A Nagegowda, Alok Kalra, **C.S. Vivek Babu***(2019). *Compatibility of inherent fungal endophytes of Withania somnifera with Trichoderma viride and its impact on plant growth and withanolide content*. **Journal of Plant Growth Regulation** (02 March 2019)<https://doi.org/10.1007/s00344-019-09928-7>, **Impact Factor (4.8)**, Corresponding Author.
- 21) Shiv S. Pandey, Sucheta Singh, Harshita Pandey, Madhumita Srivastava, Tania Ray, Sumit Soni, Alok Pandey, Karuna Shanker, **C. S. Vivek Babu**, Suchitra Banerjee, M.M. Gupta & Alok Kalra (2018). *Endophytes of Withania somnifera modulate in planta content and the site of withanolide biosynthesis*. **Scientific Reports**, Volume 8: 5450. **Impact Factor (4.966)**.
- 22) Shiv S Pandey, Sucheta Singh, **C.S. Vivek Babu***, Karuna Shanker, N K Srivastava, Ashutosh Shukla, Alok Kalra* (2016). *Fungal endophytes Curvularia sp. CATDLF5 and Choanephora infundibulifera CATDLF6 enhance vindoline content in Catharanthus roseus without affecting primary metabolism*. **Scientific Reports**; 6, Article number: 26583. **Impact Factor (4.966)**, *Co-Corresponding Author.
- 23) Shiv Shanker Pandey, Sucheta Singh, **C.S. Vivek Babu***, Karuna Shanker, Neel Kamal Srivastava, Alok Kalra* (2016). *Endophytes of opium poppy differentially modulate host plant productivity and genes for the biosynthetic pathway of benzylisoquinoline alkaloids*. **Planta**: 243(5):1097-114, **Impact Factor (4.540)**, *Co-Corresponding Author.

Patents (Granted & Filed)

- 1) Biofumigation system for food grain storage and process for food protection there from. (Indian Patent Application 202411071606; Dt 20.09.2024).
- 2) Synergistic biofumigant formulation for the control of stored product insect pests. (Indian Patent Application 202411061532; Dt 13.08.2024).
- 3) Food composition comprising broccoli extracts
[Indian Patent No.: 442411, Granted on 02/08/2023;
Published European Patent Application IN2981CH2012A on 19/06/2019].
- 4) Synergistic composition comprising myricetin and capsaicin and uses thereof
[Indian Patent No.: 424923; Granted on 13/03/2023].
- 5) Synergistic composition comprising kaempferol and quercetin and uses thereof
[Indian Patent No.: 323984; Granted on 30/10/2019].
- 6) Hybrid fermentation process for producing butyrolactone I using Aspergillus terreus ITC 01 MTCC 5498
[Indian Patent No.: 304966; Granted on 26/12/2018].

- 7) Fungal strains and a process for production of insecticide thereof
[United States Patent US8497090B2; Granted on 30/07/2013
European Patent EP2211625B1; Granted on 28/03/2012].
- 8) Method of protecting plant(s) and a process thereof
[United States Patent US8383128B2; Granted on 26/02/2013
Australian Patent AU2009227520B2; Granted on 13/03/2014].
- 9) Synergistic composition comprising plant extracts comprising resveratrol and epigallocatechin gallate and uses thereof
[Published European Patent Application IN4487CH2012A on 19/06/2015].

Product developed and Technology transferred

- 1) **IP & Technology Transfer:** The work carried out during Post doc tenure - "Design, synthesis and biological evaluation of meroterpenoid analogues as potent insecticides from *Aspergillus terreus*" has been transferred to ITC Ltd, Kolkata, on July 2008.
- 2) **Technology Transfer:** Herbal fogging disinfectants for mist sanitizer system [CFTRI PDRU No. CMF 3660; Date 19/01/2021]. The above technology has been **transferred to three industries** on Aug & Sept. 2021; March 2023.
- 3) **Product and Technologies developed:**
 - a) Herbal fogging disinfectants for mist sanitizer system [CFTRI PDRU No. CMF 3660; Date 19/01/2021]
 - b) Herbal Hand Sanitizer - Gel form [CFTRI PDRU No. CMF 3640; Date 19/01/2021]
 - c) Herbal Hand Sanitizer - Liquid form [CFTRI PDRU No. CMF 3650; Date 19/01/2021]
 - d) Herbal Potable Spray Sanitizer [CFTRI PDRU No CMF 3670; Date 19/01/2021]
 - e) Herbal Bulk Sanitizer product [CFTRI PDRU No. CMF 3680; Date 19/01/2021]

Invited lectures

- 1) Delivered Guest Lecture at **District Agriculture Training Center, Naganahalli, Mysore** on 02.12.2022 on the topic "Mitigation of mycotoxins in food grains and significance of natural insecticides in stored grain insect management"
- 2) Delivered an invited lecture on "Trends in mitigating mycotoxins in food grains" at **Stakeholders Workshop on Grain Storage and Pest Management** organized by CSIR-CFTRI, Mysore & UPL Limited, Mumbai, held on 17th and 18th August 2022.
- 3) Delivered lecture as resource person for **Short Term Training (STC) course** on "FUMIGATION AND PEST MANAGEMENT TECHNIQUES FOR STORED PRODUCTS" held at CFTRI, Mysore on 10th December 2021.
- 4) Delivered lecture as resource person for the "**Farmers training program**" held at CSIR-CIMAP, Research Centre, Bengaluru on 3rd December 2021., on the topic "Scope of essential oils in post-harvest management of food grains".
- 5) Resource person for delivering expert lecture on "**New Product Development**" during 8

Days Program on Entrepreneurship Development Programme (EDP) for Training of Trainers (TOT) of District Level Trainees (DLTs) of Karnataka State Conducted by CSIR-CFTRI, Mysore, under PM-FME Scheme held from 1st to 10th March 2021.

- 6) Delivered Invited Lecture as part of "**World Food Day 2021**" at Adichunchanagiri Institute of Medical Sciences, B.G Nagara, Karnataka on 20th November 2021.

Best Poster Awards

- 1) Received Best Poster Award for the Poster entitled "***Molecular insights on endophyte assisted biosynthesis of specialized plant metabolites***", presented during International virtual conference on Plant Specialized Metabolism and Metabolic Engineering (PSMME 2020) organized by CSIR-CIMAP, Lucknow held on 14-16th Oct, 2020.
- 2) Received best poster presentation award for the Poster entitled "***Investigation of diversity and dominance of fungal biota in stored grains and oil seeds and their control by aromatic essential oils***" during "International Virtual Conference on Emerging Trends in Food Protectants and Infestation Control" organized by CSIR-CFTRI, Mysuru – 570 020, Karnataka, held on 24 -25th Feb 2021.

Professional Associations

- ❖ Life member for The Indian Science Congress Association
- ❖ Life Member for Association of Food Scientists & Technologists (India) [AFST(I)].

Human Resource Development

- ❖ **Ph.D. and PDF students:** Currently six Ph. D students working under my supervision.
- ❖ **Project work/assignments for PG Courses like M.Sc. & M. Tech:** Guided nine dissertation students under my supervision.

❖ Doctoral Theses Guided:

1. **Ramesh Kumar Kushwaha**, Academy of Scientific and Innovative Research (AcSIR)- PhD Degree Awarded (2020).
Thesis Title: Modulation of withanolides biosynthesis in *Withania somnifera* (L.) Dunal by plant-endophyte interactions
2. **Pooja Misra**, Academy of Scientific and Innovative Research (AcSIR)- PhD Degree Awarded (2020).
Thesis Title: Studies on microbial diversity of rhizospheric soils of selected MAPs through Culture Dependent and Culture Independent approaches.
3. **Anthati Mastan**, Academy of Scientific and Innovative Research (AcSIR) - PhD Degree Awarded (2020).
Thesis Title: Plant-microbe interactions and bioprospection of microbes associated with medicinal plant - *Coleus forskohlii*.

<https://scholar.google.com/citations?user=j850pjEAAA&hl=en>