**Dr. C.S. Vivek Babu**
Senior Principal Scientist
Food Protectants & Infestation Control (FPIC) Department.
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## 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) Y. Rajashekar, H.E. Krishnaiah, **C.S. Vivek Babu (2025).** *Chemical and biological investigation of Plectranthus amboinicus essential oil in the control of Sitophilus oryzae L.* **Scientific Reports;** Volume 15, Article number: 20904. https://doi.org/10.1038/s41598-025-05689-4. **Impact Factor (3.9).**

2) Patole Reshma Prabhakar, Jeevan Prasad Reddy, P.S. Keshava Murthy, **C.S. Vivek Babu* (2025).** *Assessing the role of biodegradable polymer composites in mitigating insect infestations of pearl millet: Focus on polylactic acid and polybutylene adipate terephthalate with phytochemicals.* **International Journal of Biological Macromolecules**, Available online 21st June 2025, 145447. https://doi.org/10.1016/j.ijbiomac.2025.145447 *Corresponding Author. **Impact Factor (8.5).**

3) Archana V Remesh, **C.S. Vivek Babu* (2025).** *Insights on mitigation, fumigant persistence and oviposition deterrence of Callosobruchus chinensis using Ocimum gratissimum essential oil.* **International Biodeterioration & Biodegradation**, Volume 201, May 2025, 106048. https://doi.org/10.1016/j.ibiod.2025.106048. *Corresponding Author. **Impact Factor (4.1).**

4) Parthiban Packirisamy*, Baharani Soren*, T. Geetha*, **C.S. Vivek Babu*,** S. Ezil Vendan* **(2025).** *Effects of silica on stored product pest, Sitophilus oryzae L. (Coleoptera: Curculionidae) and its residual impact on Triticum aestivum L. grain.* **Journal of Stored Products Research**, Volume 112, May 2025, 102664. https://doi.org/10.1016/j.jspr.2025.102664. *Corresponding Author(s). **Impact Factor (2.8).**

5) Raveendran, A., Ezhil Vendan, S., **Vivek Babu, C.S.,** Singh, S.A. **(2025).** *Mitigation of Contaminants in Foods: Pesticide Residues, Heavy Metals, Mycotoxins in Various Food Commodities and Strategies for Their Mitigation to Ensure Food Safety.* In: Mondal, D., Rahman, M.M. (eds) **Food Toxicity and Safety.** Springer, Singapore. Book Chapter pp 3–36; First Online: 01 June 2025. https://doi.org/10.1007/978-981-96-4128-4_1.

6) 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).**

7) 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).**

8) 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).**

9) 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).**

10) 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).**

11) 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).**

12) 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).**

13) 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).**

14) 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).**

15) 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.

16) 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.

17) 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).**

18) 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.

19) 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),** *CorrespondingAuthor.

20) 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 3rdAug 2019). https://doi.org/10.1016/j.micres.2019.126310. **Impact Factor (6.7),** *Corresponding Author.

21) Anthati Mastan, Digeshwar Rane, Syed G. Dastager, **C.S. Vivek Babu* (2019)**. *Plant Probiotic Bacterial Endophyte, Alcaligenes faecalis, Modulates Plant Growth and Forskolin Biosynthesisin 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.

22) 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.

23) 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 Microbiologyand Biotechnology;** (17th Jan 2019) 35: 20. https :// doi.org/10.1007 /s11274-019-2593-1, **Impact Factor (4.1),** *Corresponding Author.

24) 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.

25) 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 andwithanolide content*. **Journal of Plant Growth Regulation** (02 March 2019)https://doi.org/10.1007/s00344-019-09928-7, **Impact Factor (4.8),** Corresponding Author.

26) 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).**

27) 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.

28) 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 10$^{th}$ December 2021.

4) Delivered lecture as resource person for the "**Farmers training program"** held at CSIR-CIMAP, Research Centre, Bengaluru on 3$^{rd}$ 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 1$^{st}$ to 10$^{th}$ 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 14-16$^{th}$ 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 -25$^{th}$ 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=j850pjEAAAAJ&hl=en**