



Dr. V. JANAHIRAMAN, B.Sc. (Horti), M.Sc. (Agri), Ph.D.,

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Academic Record

- **Ph.D in Agricultural Microbiology, 2008-2011**, Agricultural College and Research Institute, Madurai-625104, Tamil Nadu Agricultural University, Coimbatore, India.
- **M.Sc in Agricultural Microbiology, 2005-2007**, Agricultural College and Research Institute, Madurai-625104, Tamil Nadu Agricultural University, Coimbatore, India.
- **B.Sc in Horticulture, 2001-2005**, Horticultural College and Research Institute, Periyakulam, 625504, Tamil Nadu Agricultural University, Coimbatore, India.

Awards/Fellowships/Recognitions

- Qualified in **National Eligibility Test (NET)** for **Lectureship in Agricultural Microbiology** (Certified by Agricultural Scientist Recruitment Board(ASRB), India)

Working experience

- **APRIL 2012 – 2014. Research Associate** in the scheme AICRPAM- NICRA at Krish vigyan kendra, Agricultural College and Research Institute, Madurai-625 104. **Mentor: Dr.A.Selviramesh, (Agronomy).**
 - **MAY 2008-31.08.2008. Senior research fellow** in the scheme TN-IAMWARM at Horticulture College And Research Institute, Periyakulam, Tamil Nadu Agricultural University, India. **Mentor: Dr.A.Rathinasamy, (Soil science).**
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Teaching Experience

UG PROGRAMMES HANDLED:

Offered AGM 101(Agrl.Microbiology) course to B.Sc.(Ag) degree programme in the College of Agricultural Technology, Theni. (Affiliated by **Tamil Nadu Agricultural University**).

UG PROGRAMMES HANDLED:

Assistant professor in the Department of Rural Development Science at Arul Anandar College, Karumathur from Aug 2014 to April 2016. (Affiliated by **Madurai Kamaraj University**).

Ph.D. Research

ANTAGONISTIC POTENTIAL OF PINK PIGMENTED FACULTATIVE METHYLOTROPHIC BACTERIA AGAINST PLANT PATHOGENS OF TOMATO, BHENDI AND ONION

The wide spread use of fungicides to control plant diseases has led to an increase of health hazards due to their phytotoxicity, residual and pollution effects. Therefore, other means of disease control instead of agrochemical is the need of the hour. In this scenario biological control is a good alternative method, as compared to chemical control which destroys a range of micro and macro-organisms and has a limited impact on the environment. Biological control assumes special significance in it being an ecology conscious and cost-effective alternative strategy for disease management. Hence, the present study was aimed to isolate the potential biocontrol agent from phylloplane of crop plants to control the diseases of tomato, bhendi, onion, citrus and paddy.

In this investigation twenty facultative methylotrophic bacteria were isolated from phylloplane of crop plants. Of which 12 facultative methylotrophic strains such as PPT-1, PPN-1, PPB-1, PPBJ-1, PPG-1, PPL-1, PPP-1, PPGR-1, PPO-1, PPBO-1, PPPA-1, PPGS-1 inhibited growth of *Fusarium oxysporum*, *Rhizoctonia solani*, *Colletotrichum circinans*, *Alternaria solani*, *Alternaria helianthi*, *Pythium ultimum*, *Sclerotium hydrophilum*, and *Alternaria alternata* in a dual plate assay. The facultative methylotrophic strains PPO-1,

PPT- 1 and PPB-1 produced the diffusible (57.65, 56.55 and 55.45 %) and volatile antibiotics (52.84, 51.73 and 50.65 %) which reduced the growth of *Fusarium oxysporum*, *Pythium ultimum* (57.62, 56.52 and 55.42 ; 57.78, 56.67 and 55.56 %), *Rhizoctonia solani* (57.68, 56.58 and 55.48 % ; 44.45, 43.34 and 42.23 %), *Sclerotium hydrophilum* (57.64, 56.54 and 55.44 % ; 43.34, 42.23 and 41.12 %), *Colletotrichum circinans* (58.71, 56.51 and 55.41 % ; 55.06, 53.95 and 52.84 %), *Alternaria solani* (56.74, 55.61 and 54.43 % ; 64.06, 62.95 and 61.84 %), *Alternaria helianthi* (57.66, 56.56 and 55.46 ; 63.34, 62.23 and 61.20 %) and *Alternaria alternata* (56.78, 55.65 and 54.51 % ; 65.06, 63.95 and 62.84 %), respectively under *in vitro* condition. In a co-culture experiment, facultative methylotrophic strains PPO-1, PPT- 1 and PPB-1 significantly reduced the *Xanthomonas oryzae* pv., *oryzae* to 30.4, 30.5 and 33.9 cfu ml⁻¹ and *Xanthomonas citri* pv., *citri* to 30.5, 33.1 and 30.3 cfu ml⁻¹, respectively in nutrient broth.

Facultative methylotrophic strains PPO-1, PPT- 1 and PPB-1 produced the maximum salicylate type siderophore (134.16, 126.27 and 122.26 µg ml⁻¹), catechol type (27.94, 27.45 and 25.44 µg ml⁻¹) and salicylic acid (89, 88 and 87 µg ml⁻¹). Facultative methylotrophic strain PPO-1, significantly enhanced the germination (94, 93, and 95 %) followed by strain PPT-1 (93, 92 and 94 %) strain PPB-1 (92, 91 and 93%) respectively of tomato, onion and bhendi. Facultative methylotrophic strain pretreated tomato bhendi, onion, citrus and rice plants after challenge inoculation of pathogens significantly enhanced the survivality and reduced the disease incidence. Induction of defense enzyme and PR-proteins such as peroxidase, polyphenol oxidase, β-1, 3 glucanase, chitinase and catalase were found to be higher in facultative methylotrophic strains pretreated plants on 5 days after challenge inoculation of pathogens. Facultative methylotrophic strain PPO-1 pretreated tomato plants after challenge inoculation of *Fusarium oxysporum* (8.90 and 162.83), *Sclerotium hydrophilum* (9.08 and 166.09) *Pythium ultimum* (8.28 and 151.43), *Rhizoctonia solani* (9.35 and 17 significantly enhanced the fruit yield (no. of fruits/ plant) and fruit weight (g/plant), respectively. Similarly, strain PPO-1 pretreated onion plants after challenge inoculation of *Fusarium oxysporum* (47.23), *Sclerotium hydrophilum* (48.17), *Pythium ultimum* (43.92) and *Colletotrichum circinans* (49.59) significantly enhanced the bulb weight (g/plant) in onion. Facultative methylotrophic strains PPO-1, PPT- 1 and PPB-1 treated bhendi plants significantly enhanced the fruit yield (no. of fruits/plant) 21.60, 21.20 and 21.00 after challenge inoculation of *Fusarium oxysporum*. In a molecular characterization study, complete 16S rDNA gene sequence analysis revealed that strains PPO-1, PPT-1 and PPB-1

belonged to *Delftia* sp., *Bacillus subtilis* and *Bacillus cereus*, respectively. To best of our knowledge this is the first study to report the antagonistic potential of facultative methylotrophic bacilli. Besides, this study reported the facultative methylotrophic property in *Delftia* sp. for the first time. Facultative methylotrophic strains PPO-1, PPT-1 and PPB-1 may be recommended to manage the diseases of tomato, onion, bhendi, rice and citrus after evaluation of their performance under field conditions.

P.G. Research

THE DEVELOPMENT OF MICROBIAL CONSORTIA FOR ENHANCING THE YIELD AND QUALITY OF *Coleus forskohlii* Briq.

Medicinal coleus (*Coleus forskohlii* Briq.) is an important potential medicinal plant. The tuberous roots are rich source of forskohlin. In this study, investigations were carried out to elucidate the effect of biofertilizers viz., *Azospirillum*, phosphate solubilizing bacteria, arbuscular mycorrhizae (AM) and Pink pigmented facultative methylotrophs (PPFM). The interactive effects of the above biofertilizers with foliar spray of water, IAA, plant growth promoting rhizobacteria (PGPR) and PPFM with graded doses of inorganic fertilizers viz., N, P and K on growth and yield of medicinal coleus were also studied. Among each of the five *Azospirillum* strains isolated from coleus plant, the best isolate AZO J1, PSB J1 and AM J1 was selected for further studies based on their nitrogenase activity (44.87 n moles of ethylene release /ml /h) and IAA content (16.2 mg l⁻¹). Phosphobacterial isolate (PSB J1) was selected as the best one among the five strains isolated based on their phosphate solubilization zone (5.92cm² after an incubation period of 48hrs) and IAA production (12.5 mg l⁻¹ after an incubation period of 72hr). The PPFM isolate was selected based on the morphological character. AM isolate was selected based on the root colonization percentage (80% infection). The efficiency of the cultures was tested in pot culture experiment on *Coleus forskohlii* by factorial split plot design with two replications. The effect of combined inoculation of nitrogen fixers and phosphate solubilizer along with AM and PPFM, and graded levels of inorganic fertilizers were studied. The interaction of the basal biofertilizer application Azophos (2 kg ha⁻¹) + AM (2 kg ha⁻¹) + FYM (10 t ha⁻¹) + 40 : 60 : 50 kg NPK ha⁻¹ with foliar spray of PGPR (2%) was the most significant and recorded the maximum fresh and dry tuber yield of 370g plant⁻¹ and 27.6 g plant⁻¹, respectively as well as the forskohlin content of 1.60 ml kg⁻¹.

Research Publications

1. **Janahiraman.V.**, Sahul hameed, M., Anandham, R., 2013. Effect of plant growth promoting microorganisms on growth and yield of Medicinal Coleus.(Madras Agricultural Student's Union. (MASU)
2. Rangasamy Anandham^{1,2}, **Veeranan Janahiraman**², Pandiyan Indira Gandhi^{1,3}, Soon Wo Kwon⁴, Keun Yook Chung¹, Gwang Hyun Han¹, Joon Ho Choi⁵ and Tong Min Sa¹. Early plant growth promotion of maize by thiosulfate oxidizing bacteria which possess various thiosulfate oxidation pathway. **African Journal of Microbiological Research.**
3. **Veeranan janahiraman**¹, Rangasamy Anandham^{1*}, Soon Wo Kwon², Subbiah sundaram^{1,3}, Veeranan karthikpandi⁴, Rangasamy Krishnamoorthy¹, kiyoon kim³, sandipan samaddar³ and tongmin sa^{3*}. Control of Wilt and Rot Pathogens of Tomato by Antagonistic Pink Pigmented Facultative Methylo trophic *Delftia lacustris* and *Bacillus* spp. **Frontiers in plant science.**

Presentations in Conferences

1. **Janahiraman, V. 2007.** Influence of bio-fertilizer application on medicinal Coleus. National symposium on Perspectives of biological sciences. K.S.Rangasamy College of Technology, Tiruchengode.
2. **Janahiraman, V. 2012.** Development of microbial consortia for enhancing the yield and quality of *Coleus forskohlii* Briq. National symposium on Recent advances in bioinoculants technology at Agricultural College and Research Institute, Madurai-2012.
3. **Janahiraman, V. 2012.** Biocontrol potential of facultative methylotrophs on disease of tomato.National symposium on Recent advances in bioinoculants technology at Agricultural College and Research Institute, Madurai- 2012.
4. **Janahiraman, V. 2012.** Biological control of bhendi disease by pink pigmented facultative methylotrophs. National symposium on Recent advances in bioinoculants technology at Agricultural College and Research Institute, Madurai- 2012.
5. **Janahiraman, V. 2012.** Management of onion disease through pink pigmented facultative methylotrophs. National symposium on Recent advances in bioinoculants technology at Agricultural College and Research Institute, Madurai- 2012.
6. **Janahiraman, V. 2012.** Antagonistic potential methylotrophic bacterial strain against the *Xanthomonas* spp. National symposium on Recent advances in bioinoculants technology at Agricultural College and Research Institute, Madurai- 2012.
7. **Janahiraman, V. 2012.** Antagonistic potential of facultative methylotrophs on disease of tomato. National seminar on "Recycling of solid wastes through composting" at Agricultural College and Research Institute, Madurai- 2012.

8. **Janahiraman, V.** 2012. Biocontrol potential of pink pigmented facultative methylotrophs on diseases of onion. National seminar on “Recycling of solid wastes through composting” at Agricultural College and Research Institute, Madurai- 2012.
 9. **Janahiraman, V.** 2012. The development of microbial consortia for enhancing the yield and quality of *Coleus forskohlii* Briq. National seminar on “Breeding for abiotic stress in crop plants” at Agricultural College and Research Institute, Madurai- 2012.
 10. **Janahiraman, V.** 2012. Antagonistic potential of pink pigmented facultative methylotrophic bacteria against plant pathogens of tomato, bhendi and onion. National seminar on “Breeding for abiotic stress in crop plants” at Agricultural College and Research Institute, Madurai- 2012.
 11. **Janahiraman, V.** 2013. Long term weather analysis for Madurai station of tamil nadu. National symposium on climate change and Indian agriculture: slicing down the uncertainties. Central Research Institute for Dryland agriculture-Hyderabad.
 12. **Janahiraman, V.** 2013. Biocontrol of pink pigmented facultative methylotrophic bacteria against plant pathogens of bhendi, onion. National conference on microbial technology for sustainable development at Gandhigram Rural Institute. Gandhigram.
 13. **Janahiraman, V.** 2013. Development of new microbial consortia for enhancing yield and quality of medicinal coleus. National conference on microbial technology for sustainable development at Gandhigram Rural Institute. Gandhigram.
 14. **Janahiraman, V.** 2013. Over-view health hazards faced by laboratory workers. National seminar on Ergonomics for enhanced productivity at Home Science College and Research Institute, Agricultural College and Research Institute, Madurai-625 104.
 15. **Janahiraman, V.** 2013. Role of pink pigmented facultative methylotrophs to control the plant diseases and uses as food colorants. National conference on food processing and technology for health progression at Periyar University, Salem.
 16. Adiyaman, P. Kanchana, S. Hemalatha, G. Balakrishnan, S. **Janahiraman, V.** 2013. Studies on nutritional values and antioxidant activity of Star fruit, Egg and Fig. National conference on food processing and technology for health progression at Periyar University, Salem.
 17. Arun kumar, N. Sundarm SP. Anandham .R **Janahiraman, V** and adiyaman. V. 2013. Methionine production by microorganisms isolated from agricultural wastes National conference on food processing and technology for health progression at Periyar University, Salem.
 18. **Janahiraman, V.** 2013. Pink pigmented facultative methylotrophs to control the plant diseases and used as food colorants. Third international conference on food technology. IICPT- Thanjavur.
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Seminars/Workshops/Conferences attended

1. National symposium on “Perspectives of biological sciences” - K.S.Rangasamy College of Technology, Tiruchengode- 2007.
2. National symposium on “Recent advances in bioinoculants technology” at Agricultural College and Research Institute, Madurai- 2012.
3. National seminar on “Recycling of solid wastes through composting” at Agricultural College and Research Institute, Madurai- 2012.
4. National seminar on “Breeding for abiotic stress in crop plants” at Agricultural College and Research Institute, Madurai- 2012.
5. National conference on “microbial technology for sustainable development” at Gandhigram Rural Institute. Gandhigram.-2013
6. National symposium on “climate change and Indian agriculture:slicing down the uncertainties” central research institute for dryland agriculture-hyderabad.
7. National conference on food processing and technology for health progression at Periyar university salem.2013
8. National seminar on production, utilization and marketing of tree borne oilseeds at Agricultural College and Research Institute, Madurai-2013
9. National seminar on “Ergonomics for enhanced productivity” at Home Science College And Research Institute, Agricultural College and Research Institute, Madurai-625 104.- 2013
10. Third international conference on food technology. (IICPT) Thanjavur- 2013.
11. National conference on Agriculture Sciences (Tamil) Agricultural College and Research Institute, Madurai-2010.
12. National conference on Agriculture Sciences (Tamil), Coimbatore - 2013.
13. First agricultural graduate student conference on food safety and food security. TNAU-2013
14. Attended workshop entitle on Micro, Small and Medium Enterprises conducted Home Science College & Research institute, Tamil Nadu Agricultural University at Madurai.
15. National conference on ecological approaches towards diet for green planet- Madurai-2015.
16. National seminar on “ community microbial consortia and the human holobiont – implications of yet – unculturable microorganisms in systemic health,disease and

personalized medicine-at Department immunology and microbiology -American college -2015.

17. Attended one day training on **MUSHROOM CULTIVATION** conducted at Department of plant pathology, Agricultural College & Research institute, Tamil Nadu Agricultural University at Madurai.2015.

18. Attended Workshop on **Frontier lectures in biology** organized by Department of Zoology at Jayaraj Annapackiam college for women,Periyakulam.2016

Tamil article (Full paper)

- **\$hdfpuhkd;t.P** 2010. kUe;J Th;f;fd; fpH';fpd; cw;gj;jp kw;Wk; kfNy; nkk;ghl;ow;fhd xU';fpize;j Cl;lr;rj;J nkyhz;ik. mwptpay; jkpHpy; ntshz;ik. jkpH;ehL ntshz;ikg ;gy;fiyf; fHfk;. ntshz;ikf; fy;Y}hp kw;Wk; Muha;r;rp epiyak;,kJiu – 104.
 - Re;juk;.Rg kw;Wk; **tP. \$hdfpuhkd;** 2010 gaph;fisj; jhf;Fk; rhe;njhnkhdh!; neha; fhuzpia bkj;jpnyh ghf;Ohpak; cgnahfpj;J fl;Lg;gLj;Jjy;. mwptpay; jkpHpy; ntshz;ik. jkpH;ehL ntshz;ikg ;gy;fiyf; fHfk;. ntshz;ikf; fy;Y}hp kw;Wk; Muha;r;rp epiyak;,kJiu – 104.
 - ,uh. Mde;jk;/ ,uh. bryh!;od; me;njhdp/ **tP. \$hdfpuhkd;** 2010 jnahry;ngl;il Mf;!p\$ndw;k; bra;a[k; ghf;Ohpa';fspYs;s “bl;uhjnahndl; ,ilbghUs; (S4 1) kw;Wk; ghuhfhf;!; fe;jf Mf;!p\$ndw;wk; (PSO) Mfpa tsh;rpj khw;w tHpKiwfs; \yk; jhtu tsh;r;rp Cf;fk;. mwptpay; jkpHpy; ntshz;ik. jkpH;ehL ntshz;ikg;gy;fiyf; fHfk;. ntshz;ikf; fy;Y}hp kw;Wk; Muha;r;rp epiyak;,kJiu – 104.
 - br. bkhpdh gpnuK; Fkhhp/ **tP \$hdfpuhkd;** 2010 fj;jhpf;fhapy; nth; cl;g{rdk; ,Ltjd; \yk; kz;zpYs;s rj;Jf;fspd; ghpkhw;wk; kw;Wk; gad;fs;. mwptpay; jkpHpy; ntshz;ik. jkpH;ehL ntshz;ikg; gy;fiyf; fHfk;. ntshz;ikf; fy;Y}hp kw;Wk; Muha;r;rp epiyak;,kJiu – 104.
 - n\$. gpughfud; /"h. n\$K;!; gpr;ir/ fh. mUs;bkhHp bry;td;/ ,. tpky;n\$hp kw;Wk; **tP.\$hdfpuhkd;** 2010 ug;gh; kw;Wk; rf;fiu Miyf; fHpt[fisg; gad;gLj;jp bey;ypy; kfNy; mjpfhpj;jy;. mwptpay; jkpHpy; ntshz;ik. jkpH;ehL ntshz;ikg; gy;fiyf; fHfk;. ntshz;ikf; fy;Y}hp kw;Wk; Muha;r;rp epiyak;,kJiu – 104.
-

Book chapter

- **tP. \$hdfpuhkd;** kw;Wk; Rg. Re;juk; - mnrhgh!;nkl; - brhl;L ePh; ghrd epyj;jpw;F Vw;w jput Ez;qaph; cuk; - fUk;gpy; Jy;ypa gz;iza rhFgo gapw;rp ifnaL
- Re;juk;.Rg/ **tP. \$hdfpuhkd;** / ,uh. Mde;jk; kw;Wk; vk;.rhFy;QkPJ . Ez;qaph; cu';fs; - gad;ghLfs; - gH';fs;/ thridg; gaph;fs; kw;Wk; kyh; gaph;fspy; cah; tpisr;ry; rhFgo bjhHpy; El;g gapw;rp ifnaL.
- bry;tpunk!; / **tP. \$hdfpuhkd;**/ eh. nrh. bt';fl;luhkd; khdhthhp vs;spy; cah; tpisr;rYf;F etPd bjhHpy; El;g';fs; - epy tsk-; gf;fk; -6-7.
- bry;tpunk!; / **tP. \$hdfpuhkd;**/ eh. nrh. bt';fl;luhkd; - vs;spy; xU';fpize;j gaph; nkyhz;ik Kjy;epiy bray; tpsf;fj; jply;fs; - cHthpd; tsUk; ntshz;ik – gf;fk.; 6

Tamil popular article

- eh.nrh. bt';fl;luhkd;/ bry;tpunk!; kw;Wk; **tP. \$hdfpuhkd;** - bgphahW itif ghrdj;jpy; nkl;L epy';fspy; tUkhdk; bgw khw;g; gaph; -jpdkyh; - etk;gh; 29 - 2012
- eh.nrh. bt';fl;luhkd;/ bry;tpunk!; kw;Wk; **tP. \$hdfpuhkd;** - bgphahW itif ghrdg; gFjpfspy; twl;rpf;nfw;w vs; rhFgo – jpdkzp – ork;gh; 6-2012.

Book published with ISBN

tP. \$hdfpuhkd; kw;Wk; **tP. fhj;jjpf;** **ghz;o** - kz;zpy; njhd;wpa khzpf;fk; (fhshd; tsh;g;g[])- ISBN-978-93-85109-35-5 – nth;fs; gjpg;gfk;- \$dthp 2016.

Research area/ specialization and techniques:

- Plant-microbe interactions
 - Biological control of plant diseases
 - Basic microbiology techniques
 - molecular techniques includes electrophoresis
 - PCR
 - Protein Characterization and Purification
 - SDS-Page
 - Analytical Works Includes – TLC, GC
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Awards and Achievement

- The best oral presentation award from National symposium on **“Recent advances in bioinoculants technology”** at Agricultural College and Research Institute, Madurai-2012.
 - Resource person on youth-led sustainable development programme at Arul Anandar College, Karumathur, the entitle on **Organic Farming-2016**.
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Society Membership

- ✓ National academy of biological sciences (NABS) - **LIFE MEMBER.**
 - ✓ Probiotic Association of India- **NATIONAL DAIRY RESEARCH INSTITUTE (NDRI) –ICAR - KARNAL - LIFE MEMBER.**
 - ✓ Association Of Microbiologists Of India- **LIFE MEMBER**
 - ✓ Nilavalam – **LIFE MEMBER** -Tamil Nadu co-operative state agriculture and rural development bank ltd.
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Newer microorganism of agricultural importance submitted to NCBI

Strain	Closed relative	NCBI Accession No
PPO-1	<i>Delftia</i> sp	JN 088183
PPT-1	<i>Bacillus subtilis</i>	JN088185
PPB-1	<i>Bacillus cereus</i>	JN088184
S2/H14	<i>Bacillus subtilis</i> sub sp <i>Spizizenii</i>	KC851825
S2/H16	<i>Bacillus tequilensis</i>	KC851826
S4/P4	<i>Enterobacter mori</i>	KC851827
S3/P9	<i>Bacillus tequilensis</i>	KC851828
S4/P11	<i>Bacillus subtilis</i> sub sp <i>Subtilis</i>	KC851829
S4/P13	<i>Enterobacter mori</i>	KC851830
S1/F1	<i>Bacillus safensis</i>	KC851831
S4/F3	<i>Bacillus subtilis</i> sub sp <i>Inaquosorum</i>	KC851832
S2/F10	<i>Bacillus subtilis</i> sub sp <i>Spizizenii</i>	KC851833
S2/F11	<i>Bacillus aerophilus</i>	KC851834
S2/F14	<i>Bacillus endophyticus</i>	KC851835
S2/G2/A1	<i>Bacillus subtilis</i> sub sp <i>Subtilis</i>	KC851836
S3/G10	<i>Bacillus tequilensis</i>	KC851837
S2/G12	<i>Bacillus siamensis</i>	KC851838
S2/G13	<i>Bacillus tequilensis</i>	KC851839
S1/G15	<i>Bacillus subtilis</i> sub sp <i>Subtilis</i>	KC851840

Additional responsibility

- **APRIL 2012 – 2014. Residential Tutor-** Valluvar Hostel and PG Hostel at Agricultural College and Research Institute, Madurai-625 104.

Personal Details

Father Name : **Mr. Late .A.VEERANAN**
Mother Name : **Mrs .V.UMA**
Marital Status : **MARRIED**
Nationality : **HINDU**

Languages known : **ENGLISH**

Permanent Address

Main Street, Annanji-625531,

Theni (Dt & Tk), TamilNadu.

India. **94 88 36 20 87**

Reference

<p>Dr. S. NAKKEERAN, Professor Department of Plant Pathology Tamil Nadu Agriculture University Coimbatore - 641 003. E.mail: nakkeeransingai@yahoo.com</p>	<p>Dr.G.GOPALASWAMY, Professor (Biotechnology), Department of Pulses, Tamil Nadu Agricultural University, Coimbatore-641003 E.mail: ggswamy@gmail.com</p>
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