**M. Rajkumar. Ph. D**

DBT - Ramalingasami Fellow
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## Research Interest

Plant and Environmental Biology
(Heavy metal phytoremediation, Host - Microbe interaction, Climate change)

## Education

- **Ph. D** (Environmental Biology) August 2002. Anna University, India.
- **M. Sc** (Botany), April 1996. Madurai Kamaraj University, India.
- **B. Sc** (Botany, Chemistry & Zoology) April 1994. Madurai Kamaraj University, India.

## Professional Experience

- **Ramalingaswami Re-entry Fellow** (16/08/2013 - till date), Dept. of Life Sciences, CUTN, Thiruvarur.
- **Ramalingaswami Re-entry Fellow** (02/03/2011 – 14/08/2013), CSIR-NEERI, Chennai Zonal Lab, Chennai.
- **JSPS Fellow** (08/09/2008 – 08/09/2010), Kobe University, Japan
- **FCT Post Doctoral Fellow** (04/04/2006 – 31/08/2008), University of Coimbra, Portugal.
- **Post Doctoral Fellow** (01/06/2003 – 20/01/2006), Chonbuk National University, South Korea.
- **Lecturer** (15/04/2002 – 29/04/2003), KSR college of Technology, Tiruchengode, TN, India

## Research Supervision

| Name of the student | Program | Institution | Period | Title of Ph.D/PDF work |
|---|---|---|---|---|
| Ying Ma | Ph.D | Centre for Functional Ecology, University of Coimbra, Coimbra- Portugal | Feb 2007-May 2010 (Awarded) | Enhanced Phytoextraction of Metal Contaminated Soils Using Plant Growth Promoting Bacteria |
| Dr. Ying Ma | Post Doctoral Fellowship [PDF] | Centre for Functional Ecology, University of Coimbra, Coimbra- 3000-455, PORTUGAL. | Since Jan 2013 – Till date | Symbiotic Efficiency of plant growth promoting bacteria (PGPB) and arbuscular mycorrhizal fungus (AMF) for phytoremediation of metal contaminated soils - Sponsored by Portuguese Foundation for Science and Technology-FCT (Government of PORTUGAL) |

http://cfe.uc.pt/index.php?menu=18&language=eng&tabela=pessoaldetail&user=33

**Publications - Citation indices**

Peer-reviewed Papers: 45
Conference: 38
Total citations: >2220
H Index: 22
**https://scholar.google.co.in/citations?user=p2lDQO0AAAAJ&hl=en**

**List of Publications**

1. Jayashree C., Tamilarasan K., Rajkumar M., Arulazhagan P., Yogalakshmi KN., Srikanth M., Rajesh Banu J. (2016) Treatment of seafood processing wastewater using upflow microbialfuel cell for power generation and identification of bacterial community in anodic biofilm, 180. 351-358. *Journal of Environmental Management*, (IF; 3.057).
2. S. Kavitha, J. Rajesh Banu, J. Vinoth Kumar, M. Rajkumar (2016) Improving the biogas production performance of municipal waste activated sludge via disperser induced microwave disintegration. Bioresource Technology (in press) (IF 4.49)
3. Y Ma, M. Rajkumar, C. Zhang, H. Freitas. (2016). Beneficial role of bacterial endophytes in heavy metal phytoremediation. *Journal of Environmental Management.* 174, 14-25 (IF; 3.057).
4. Y. Ma, R.S. Oliveira., L. Wu., Y. Luo., M. Rajkumar, I. Rocha, H. Freitas (2015) Inoculation with metal mobilizing plant growth promoting rhizobacterium *Bacillus* sp. SC2b and its role in rhizoremediation. *Journal of Toxicology and Environmental Health, Part A, Current Issues* 78*,* 931- 944 (IF; 2.35)
5. Y. Ma., R.S. Oliveira., F. Nai., M. Rajkumar., Y. Luo., I. Rocha., H. Freitas. (2015). The hyperaccumulator Sedum plumbizincicola harbors metal-resistant endophytic bacteria that improve its phytoextraction capacity in multi-metal contaminated soil. *Journal of Environmental Management,* 156; 62-69 (IF; 3.057).
6. Y. Ma, M. Rajkumar, I. Rocha, R. S. Oliveira, H. Freitas (2015) Serpentine bacteria influence metal translocation and bioconcentration of *Brassica juncea* and *Ricinus communis* grown in multi-metal polluted soils. *Frontiers in Plant Science*, 5; 757 (doi: 10.3389/fpls.2014.00757) (IF 3.9)
7. M. Rajkumar, Y. Ma., H. Freitas (2013). Improvement of Ni phytostabilization by inoculation of Ni resistant *Bacillus megaterium* SR28C. *Journal of Environmental Management* 128: 973-980 (IF; 3.057).
8. Y. Ma., M. Rajkumar, Y. Luo, H. Freitas (2013). Phytoextraction of heavy metal polluted soils using *Sedum plumbizincicola* inoculated with metal mobilizing *Phyllobacterium myrsinacearum* RC6b. *Chemosphere 93:* 1386-92 (IF; 3.137).
9. M. Rajkumar, R. Jayakumar, H. Freitas. (2013) Effects of Chitosan Derivatives on Plant Growth and Ni uptake in *Ricinus communis* and *Helianthus annuus*. *Journal of Chitin and Chitosan Science.* 1:65-70.
10. M. Rajkumar., M.N.V. Prasad., S. Sandhya., H. Freitas (2013) Climate change driven plant-metal-microbe interactions. *Environment International* 53:74-86. (IF; 6.248).
11. M. Rajkumar., S. Sandhya., M.N.V. Prasad., H. Freitas (2012) Perspectives of plant associated microbes in heavy metal phytoremediation. *Biotechnology advances* 30:1562–1574 (IF; 9.59).
12. T. Yoshida , N. Ae , J.H. Park , M. Rajkumar , J. Kasuga, S. Matsumoto (2012) Detection of soil organic nitrogen in xylem sap collected from non-mycorrhizal plants using an

immunological technique. *Communications in Soil Science and Plant Analysis* 43:2669–2678 (IF; 0.506).
13. Y. Ma, M. Rajkumar, Y. Luo, H. Freitas (2011) Inoculation of endophytic bacteria on host and non-host plants – Effects on plant growth and Ni uptake. *Journal of Hazardous Materials*. 196, 230-237 (IF; 4.173).
14. X. Qing, N. Ae, T. Suzuki, M. Rajkumar, Fukunaga, N. Fujitake (2011) Assessment of potentially reactive pools of aluminum in Andisols using a five-step sequential extraction. *Soil Science & Plant Nutrition*. 57, 500-507. (IF; 1.017).
15. Y. Ma, M.N.V. Prasad, M. Rajkumar, H. Freitas (2011) Plant growth promoting rhizobacteria and endophytes accelerate phytoremediation of metalliferous soils. *Biotechnology Advances.* 29,248-258 (IF; 9.646).
16. M. Rajkumar, N. Ae, M.N.V. Prasad, H. Freitas (2010) Potential of siderophore producing bacteria for improving heavy-metal phytoextraction. *Trends in Biotechnology*. 28, 142-149 (IF*;* 9.644).
17. Y. Ma, M. Rajkumar, J.A.F. Vicente, H. Freitas (2010). Inoculation of Ni-resistant plant growth promoting bacterium *Psychrobacter* sp. strain SRS8 for the improvement of nickel phytoextraction by energy crops. *International Journal of Phytoremediation*. 13,126-139 (IF; 1.936).
18. M. Rajkumar, N. Ae., H. Freitas, (2009) Endophytic bacteria and their potential to enhance heavy metal phytoextraction. *Chemosphere* 77, 153–160 (IF*;* 3.253).
19. R. Jayakumar, M. Rajkumar, H. Freitas, N. Selvamurugan, S. V. Nair, T. Furuike, H. Tamura, (2009). Bioactive and metal uptake studies of carboxymethyl chitosan-graft-D-glucuronic acid membranes for tissue engineering and environmental applications. *International Journal of Biological Macromolecules*. 45, 135–139 (IF; 2.366).
20. M. Rajkumar, M.N.V. Prasad, H. Freitas, N. Ae (2009). Biotechnological applications of serpentine soil bacteria for phytoremediation of heavy metals. *Critical Reviews in Biotechnology.* 29, 120-130 (IF; 3.567).
21. Y. Ma, M. Rajkumar and H. Freitas (2009). Improvement of plant growth and nickel uptake by nickel resistant-plant growth promoting bacteria, *Journal of Hazardous Materials*. 166, 1154-1161. (IF; 4.144).
22. Y. Ma, M. Rajkumar and H. Freitas (2009). Isolation and characterization of Ni mobilizing PGPB from serpentine soils and their potential in promoting plant growth and Ni accumulation by *Brassica* spp. *Chemosphere* 75, 719-725 (IF; 3.253).
23. R. Jayakumar, M. Rajkumar, H. Freitas, N. Selvamurugan, S. V. Nair, T. Furuike, H. Tamura (2009), Preparation, characterization, bioactive and metal uptake studies of alginate/phosphorylated chitin blend films. *International Journal of Biological Macromolecules,* 44. 107–111. (IF; 2.366).
24. Y. Ma, M. Rajkumar and H. Freitas. (2009) Inoculation of plant growth promoting bacterium *Achromobacter xylosoxidans* strain Ax10 for the improvement of copper phytoextraction by *Brassica juncea*. *Journal of Environmental Management*. 90. 831-837. (IF; 2.367).
25. M. Rajkumar, Y. Ma., H. Freitas (2008). Characterization of metal resistant plant growth promoting *Bacillus weihenstephanensis* isolated from serpentine soil in Portugal. Journal of Basic Microbiology. 48. 500-508. (IF; 1.051).
26. M. Rajkumar, K.J. Lee and H. Freitas (2008). Effects of chitin and salicylic acid on biological control activity of *Pseudomonas* spp. against damping off of pepper. *South African Journal of Botany*. 74. 268–273. (IF; 1.113).
27. M. Rajkumar and H. Freitas (2008). Influence of metal resistant-plant growth promoting bacteria on the growth of *Ricinus communis* in soil contaminated with heavy metals, *Chemosphere.* 71, 834-842. (IF; 3.054).

28. M.N.V. Prasad, M. Rajkumar, H. Freitas. (2008) Rehabilitation of abandoned mine sites: connection to bioprospecting of metal tolerant plants and phytoassisted rhizoremediation. *The Palaeobotanist*, 57 (3):559-571.
29. M. Rajkumar and H. Freitas (2008), Effects of inoculation of plant-growth promoting bacteria on Ni uptake by Indian mustard. *Bioresource Technology*. 99, 3491-3498. (IF; 4.453).
30. M. Prabaharan, M. Rajkumar and R. Jayakumar (2007), Chitosan and its derivatives: Promising materials for textile finishing. *Asian Chitin Journal*. 3, 1-14.
31. Kui Jae Lee, Min Kyung Choi, Wang Hyu Lee and M. Rajkumar (2006). Molecular Analysis of Korean Isolate of Barley Yellow Mosaic Virus. *Virus genes*. *32, 175-180.* (IF; 1.102).
32. M. Rajkumar, R. Nagendran, Kui Jae Lee and Wang Hyu Lee (2006). Influence of plant growth promoting bacteria and $Cr^{6+}$ on the growth of Indian mustard. *Chemosphere, 62, 741-748.* (IF; 2.448).
33. J. Rajesh Banu, S. Kaliappan, M. Rajkumar and Dieter Beck (2006). Treatment of spent wash in anaerobic mesophilic suspended growth reactor (AMSGR). *Journal of Environmental Biology,* 27 (1). (IF; 0.197)
34. M. Rajkumar, R. Nagendran, Kui Jae Lee and Wang Hyu Lee (2005). Characterization of a novel $Cr^{6+}$ reducing *Pseudomonas* sp. with plant growth-promoting potential. *Current Microbiology, 50, 266-271. (*IF; 1.059)
35. M. Rajkumar, Wang Hyu Lee and Kui Jae Lee (2005). Screening of bacterial antagonists for biological control of *Phytophthora* blight of pepper. *Journal of Basic Microbiology*, 45(1), 55-63. (IF; 1.000)
36. M. Rajkumar, Kui Jae Lee, Wang Hyu Lee and J. Rajesh banu. (2005). Growth of *Brassica juncea* under chromium stress: Influence of siderophores and indole 3 acetic acid producing rhizosphere bacteria. *Journal of Environmental Biology,* 26 (4). 693-699. (IF; 0.340)
37. R. Jayakumar, Y.S. Lee, M. Rajkumar, S. Nanjundan, (2004). Synthesis, characterization, and Antibacterial Activity of Metal-Containing Polyurethanes. *Journal of Applied Polymer Science* 91(1), 288-295. (IF; 1.021)
38. Arun. A, B. S. R. Reddy, and M. Rajkumar (2003), Polymeric Drug for Antimicrobial Activity Studies: Synthesis and Characterization. *Journal of Bioactive and Compatible Polymers*, 18(3), 219 - 228. (IF; 0.322)
39. R. Jayakumar, M. Rajkumar, R. Nagendran and S. Nanjundan. (2002) Synthesis and characterization of metal containing polyurethane having antibacterial activity. *Journal of Applied Polymer Science,* 85(6), 1194-1206. (IF; 0.927)
40. R. Jayakumar, S. Nanjundan, M. Rajkumar and R. Nagendran (2001), Studies on metal containing polyurethanes based on divalent metal salts of Mono (hydroxy ethoxy ethyl) pthalate. *Journal of Macromolecular Science, Part A-Pure and Applied Chemistry,* 38(9), 869-888. (IF; 0.718)
41. M. Rajkumar and R. Nagendran (2000), Studies on the effects of chromium stress on the germination and growth of *Phaseolus mungo* - Influence of chromium resistant *Pseudomonad. J. Environ. Sci. Health Part A-Toxic/Hazard. Subst. Environ. Eng.,* A35 (4), 625-634. (IF; 0.377)
42. R. Jayakumar, M. Rajkumar and S. Nanjundan (2000), Synthesis, characterization and antibacterial activity of Mono (Hydroxy ethoxy ethyl) Pthalate. *Oriental Journal of Chemistry*. 16(2), 243-248.
43. M. Rajkumar, R. Nagendran and S. Sasikumar, (1999) Removal of Trivalent Chromium from Wastewater using Red mud. *Indian Journal of Environmental Protection.* 27 (2), 97-100.
44. R. Jayakumar, M. Rajkumar and S. Nanjundan (1999), Synthesis, characterization and antibacterial activity of divalent metal salts of Mono (Hydroxy Pentyl) Pthalate, *Oriental Journal of Chemistry*. 15(3), 437-440.

45. M. Rajkumar and K. Dharmaraj (1999) Reuse of Agro-Waste for Culture of Oyster Mushroom *Pleurotus Citrinopileatus* (Fr.) Singer. *Indian Journal of Environmental Health*. 41(2), pp 130-134.

**Book Chapters**

1. Zarin Taj, Z., Rajkumar M (2016) Perspectives of plant growth-promoting actinomycetes in heavy metal phytoremediation – In Plant growth-promoting actinomycetes: A new avenue for enhancing the productivity and soil fertility of grain legume. Editors: Subramaniam Gopalakrishnan, Arumugam Sathya, Rajendran Vijayabharathi, Springer Singapore, ISBN 978-981-10-0707-1
2. D. Annapurna, M. Rajkumar, M.N.V. Prasad (2015) Potential of castor bean (Ricinus communis L.) for phytoremediation of metalliferous waste assisted by plant growth promoting bacteria possible cogeneration of economic products. Bioremediation and Bioeconomy Editor M.N.V. Prasad. Amsterdam: Elsevier, The Netherlands. ISBN: 978-0-12-802830-8.

**Conference**

1. Zarin Tai Z, Harikrishnan H, Shanmugaiah V, Rajkumar M. Microbially synthesized silver nanoparticle as an effective bio-nanofungicide against fusarium wilt disease in banana. International conference on Recent Trends in Biosciences. 07$^{th}$ – 09$^{th}$ April, 2016. Alagappe University, Karaikudi - 630003, India
2. Zarin Taj, Z., Dinakar, C., Rajkumar, M. Phytoremediation of Hydrocarbons by *Leucaena leucocephala* Inoculated with Plant Growth Promoting Rhizobacteria. National Conference on Emerging Trends in Plant Sciences, 10-11 March 2016, Department of Plant Sciences, Bharathidasan University, Trichy. India
3. Zarin Taj. Z and Rajkumar, M. Effects of climate change on plant growth and phytoremediaion potential in crude oil polluted soils" National Conference on Advances in Biological and Environmental Sciences'' (NCABES- 2016) Feb 2016. The Gandhigram Rural Institute - DU, Gandhigram – 624 302. India
4. Benedict Bruno, L., Rajkumar, M and Sandhya, S "An integrated approach for Carbon dioxide mitigation and enhancement of fatty acid production from Microalgae: A Key for renewable and sustainable energy management" National Conference on Advances in Biological and Environmental Sciences'' (NCABES- 2016) Feb 2016. The Gandhigram Rural Institute - DU, Gandhigram – 624 302. India
5. Zarin Taj, Z., Dinakar, C., Rajkumar, M. Influence of plant beneficial bacteria on phytoremediation of crude oil polluted soils under altered climatic conditions International Conference on "Biodiversity and Bioactive Natural Products for Human Welfare – Government Arts College, Karur – 639 005, 10-12 February 2016.
6. M. Rajkumar and Dinakar C. Delivered lecture on "Basic Microbiology Practical Course" in 5 day workshop on biological techniques and tools. 19$^{th}$ to 23rd January 2016, Central University of Tamil Nadu, Tiruvarur, India
7. Dinakar C and M. Rajkumar. Delivered lecture on "Protein analysis from plant leaves" in 5 day workshop on biological techniques and tools. 19$^{th}$ to 23$^{rd}$ January 2016, Central University of Tamil Nadu, Tiruvarur, India
8. Zarin Taj Z., Dinakar C., and M. Rajkumar. Isolation, characterization of salt tolerant endophytic plant growth- promoting bacteria and their potential role in conferring salinity tolerance in Tomato plants. International Symposium on Biodiversity, Agriculture, Environment and Forestry, 11-12 December 2015, Ooty, India.

9. Zarin Taj and M. Rajkumar. Isolation, Characterization of Hydrocarbon degrading rhizophere bacteria and their potential role in growth promotion of Indian mustard. BIOGALAXIA 15, National Level Symposium organized by Department of Microbial Biotechnology, 18th December 2015. Bharathiar University, Coimbatore, India
10. M. Rajkumar. Effect of climate change on plant-microbe interaction in polluted soils (Invited Talk) UGC sponsored National Conference on Current Perspectives and challenges in Biodiversity and its conservation, 6-7th March 2015. Raja Serfoji Government Collage, Tanjore. India
11. Zarin Taj and M. Rajkumar. Microbial synthesized silver nano-particles as effective nanocides against Phytopathogens. UGC sponsored National Symposium on recent advances in Biomedical Technology (RABT), 26th – 27th February 2015, Thiruvalluvar University, Vellore, India
12. Ying Ma, Zarin Taj, Helena Freitas, M. Rajkumar, Influence of Metal resistant serpentine Rhizobacteria on heavy metal and drought stress tolerance in *Brassica oxyrrhina*. UGC sponsored National Symbosium on recent advances in Biomedical Technology (RABT), 26th – 27th February 2015, Thiruvalluvar University, Vellore, India
13. Z, Zarin Taj and M. Rajkumar, Biocontrol of Phytopathogens by Plant Growth Promoting Rhizobacteria (PGPR) - Fluorescent Pseudomonads. National seminar on "Recent Trends and Future Advances in Life Sciences" (RTFALS) 26th – 27th February 2015, Central University of TamilNadu, Tiruvarur, India
14. M. Rajkumar, Perspectives of Bacterial Organic Acids in Heavy Metal Phytoremediation, National seminar on "Recent Trends and Future Advances in Life Sciences" (RTFALS) 26th – 27th February 2015, Central University of Tamil Nadu, Tiruvarur, India
15. M. Rajkumar, Plant Growth-Promoting Endophytic Bacteria for Phytoremediation of Metal Polluted Soils. National seminar on "Recent Trends and Future Advances in Life Sciences" (RTFALS) 26th – 27th February 2015, Central University of Tamil Nadu, Tiruvarur, India
16. M. Rajkumar, Qing-xia Dai, Noriharu Ae, Takeshi Suzuki. Combined application of plant growth regulators and metal chelators for the improvement of heavy metalphytoextraction. Abstracts of the meeting, the Society of the Science of Soil and Manure (56), 172, 2010-09-07. Japanese Society of Soil Science and Plant Nutrition. Japan
17. Dai Qingxia, Noriharu Ae, Takasi Suzuki, M. Rajkumar. Soil Al fraction with relation to plant Availability. 105th Japan Soil Science and Plant Nutrition Conference, Kouchi Hall. Kouchi Province, December 11, 2009. Japan.
18. M. Rajkumar, Y. Ma, N. Ae, H. Freitas. Characterization of Ni-resistant plant growth promoting bacterium *Bacillus megaterium* for microbial-assisted phytoremediation of Ni contaminated soils. III International conference on Environmental, Industrial and Applied Microbiology December 2-4, 2009, University of Lisbon, Lisbon, Portugal.
19. Y. Ma, M. Rajkumar, N. Ae and H. Freitas. Isolation and characterization of Ni resistant endophytic bacteria from *Alyssum serpyllifolium* and their potential in promoting plant growth and Ni accumulation by host and non-host plants. III International conference on Environmental, Industrial and Applied Microbiology (December 2-4, 2009, University of Lisbon, Lisbon, Portugal
20. Taiichiro Yoshida, M. Rajkumar, Noriharu Ae & Jung-Hyen Park. Non-mycorrhizal plant, qing-geng-cai can absorb directly high molecular weight substance, named PEON. 6th International Symposium on Electron Microscopy in Medicine and Biology 2009. (Sep 16-18, 2009) Kobe University, Kobe, Japan.
21. M. Rajkumar, Qingxia Dai, Takashi Suzuki & Noriharu Ae. Possible role of root cell wall properties in heavy metal uptake in hyperaccumulator plant species. MARCO SYMPOSIUM 2009 -Challenges for Agro-Environmental Research in Monsoon Asia (Oct 5-7, 2009), National Institute of Agro-Environmental Sciences (NIAES), Tsukuba, Japan.

22. M. Rajkumar, Manoel Bandeira and Helena Freitas, Analysis of rhizosphere bacterial diversity of metallophytes from north-east of Portugal, workshop on "Bioavailability of pollutants and soil remediation, Seville, Spain, 10-13 September 2006.
23. M. Rajkumar, H. M. Kim, K. J. Lee, W. H. Lee, Y. S. Lee, and B.T. Oh, Effect of chitin on biological control activity of fluorescent pseudomonads against damping off of pepper (*Capsicum annuum*). Korean society of plant pathology, Chonnum National University, Korean society of plant pathology, Gwangju, South Korea, 22- April 2005.
24. M. Rajkumar, H. M. Kim, K. J. Lee, W. H. Lee, J. H. Kim, and B. T. Oh, Screening and Characterization of Plant Growth Promoting *Pseudomonas* spp. for Biological Control of Damping off of Pepper caused by *R. solani.* Korean society of plant pathology, Chonnum National University, Korean society of plant pathology, Gwangju, South Korea, 22- April 2005.
25. M. Rajkumar, Min Kyung Choi, Jun Sik Park, Kui Jae Lee, and Wang Hyu Lee, Screening of *Pseudomonas* spp. for biological control of Phytophthora blight of pepper, The 10th International symposium on " Application of Plant resources in Industrial Biotechnology" The plant resources society of Korea, Kyung Hee University, South Korea, 29 - October 2004.
26. M. Rajkumar, Rae Yun Cho, Su Hi Jeon, Kui Jae Lee and Wang Hyu Lee, Antagonistic effect of *Pseudomonas* spp. on pathogenic fungi and enhancement of growth of red pepper, The 10th International Symposium on "Application of Plant resources in Industrial Biotechnology" The plant resources society of Korea, Kyung Hee University, South Korea, 29 - October 2004.
27. M. Rajkumar, R.Nagendran, Kui Jae Lee and Wang Hyu Lee. Growth of *Phaseolus mungo* under chromium stress: influence of chromate reducing bacteria. 10th International conference on new materials development from plants. The plant resources society of Korea, South Korea, 9-11 October 2003.
28. M. Rajkumar, Kui Jae Lee and Wang Hyu Lee. Enhancing resistance of Red pepper to Phytophthora Blight disease by seed treatment with plant growth promoting rhizobacteria. Plant pathology symposium, Korean society of plant pathology, South Korea, 9-11 October 2003.
29. M. Rajkumar, Kui Jae Lee, Wang Hyu Lee and R. Nagendran. Plant growth-promoting rhizobacteria that decrease chromium toxicity in *Brassica juncea.* 10th International conference on new materials development from plants. October. The plant resources society of Korea, South Korea, 9-11 October 2003.
30. M. Rajkumar and D. Jeyabalan. Growth of *Phaseolus mango* under chromium stress influence of phosphate solublizing bacteria. National Conference on "Recent Trends in Insect Control", Bharathiar University, Coimbatore, India. 22-24 January 2003.
31. M. Rajkumar and D. Jeyabalan. Chromate reducing bacteria that decrease chromium toxicity in plants. National Conference on Recent Trends in Insect Control, Bharathiar University, Coimbatore, India. 22-24 January 2003.
32. D. Jeyabalan, K. Murugan and M. Rajkumar. Neem (Azadirachtin) and *Bt* toxins (*Bacillus thuringiensis*) as a potential combination for the control of tobacco cutworm, *Spodoptera litura*. National Conference on Recent Trends in Insect Control, Bharathiar University, Coimbatore, India. 22-24 January 2003.
33. D. Jeyabalan and M. Rajkumar. Biological activity of some Indian medicinal plants against mosquito *Anopheles stephensi.* National Conference on Recent Trends in Insect Control, Bharathiar University, Coimbatore, India. 22-24 January 2003.
34. R. Jayakumar, M. Rajkumar, R.Balaji, R.Arun Prasath and S.Nanjundan. Synthesis and Characterization of metal containing polyurethane having antibacterial activity. Ist International symposium on macro and supramolecular architectures and materials:

Biological and synthetic systems, Kwanju Institute of Science and Technology, South Korea, 11-14 April 2001.

35. R. Jayakumar, M. Rajkumar, R.Nagendran and S.Nanjundan. Studies on metal containing polyurethanes based on divalent metal salts of Mono (hydroxyethoxyethyl) pthalata. National conference on material for the new millennium. Cochin University of Science and Technology, Kochi, India. 1-3. March 2001.
36. R. Jayakumar, S. Nanjundan, M. Rajkumar and R. Nagendran. Synthesis characterization and antibacterial activity of metal containing polyurethanes. International conference on advances in surface science and engineering. University of Madras, Madras, India 21-23 February 2001.
37. R. Jayakumar, R. Arun Prasath, M. Rajkumar and S. Nanjundan, Synthesis, Characterization and antibacterial activity of divalent metal salts of mono (hydroxyethoxyethyl)phthalate , 18$^{th}$ Conference on Indian council of chemists, North Maharastra University, Jalgaon, India, December. 27-29,1999.
38. R. Jayakumar, R. Arun Prasath, M. Rajkumar and S. Nanjundan, Studies on divalent metal salts of mono (hydroxypentyl)phthalate and their antimicrobial activity, 18$^{th}$ Conference on Indian council of chemists, North Maharastra University, Jalgaon, India, December. 27-29, 1999.

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