

Dr. AKHILA RAJAN

Assistant Professor

Department of Microbiology

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EDUCATION

- *Ph. D in Biotechnology* Kerala University, Trivandrum, India

Thesis Title: “Purification, Characterization and Modification of microbial lipase”

- *M.Phil in Microbial Technology* with first class from Manonmaniam Sundarnar University, Tirunelveli, Tamilnadu, India.
- *M.Sc. in Microbiology* with first class and rank from Manonmaniam Sundarnar University, Tirunelveli, Tamilnadu, India.
- *B.Sc. in Zoology* with first class from Kerala University, Kerala, India
- Certificate Course in *r DNA Technology* from Kerala University
- World Intellectual Property Rights (WIPO DL101) course on Patents

Number of publications: 23, Number of patents: 2

h index: **15**,

i10-index: **18**

Cumulative impact factor: **37.08**

ACADEMIC RESPONSIBILITIES UNDERTAKEN

- Question paper setter (Kerala and Kannur University)
- Chairperson, PG & UG Board of Examiners, Kerala University

POSITIONS HELD (COLLEGE LEVEL)

- Research Committee Co-Ordinator (2019- 2022) ▪ Library Advisory Committee Co-Ordinator
- Co-Ordinator-Harassment against Women at Work place (2019-2020)
 - Resident Tutor
- Asst Superintendent, Exam Cell
- Internal Mentor, Scholar Support Programme (SSP) & Walk with the Scholar (WWS)
- Admission Committee Member

PROJECTS ASSOCIATED

2014-2018: SERB Young Scientist Project ‘Preparation of hydrogel formulations from cholecystic extracellular matrix for biomedical applications’ at Department of Experimental Pathology, BMT Wing, SCTIMST, Trivandrum.

2012-2014: DBT Project ‘Development of skin graft substitutes from mammalian derived extracellular matrix’ at Department of Experimental Pathology, BMT Wing, SCTIMST, Trivandrum.

2003-2006: DBT Project ‘Development of Crosslinked Enzyme Crystals’ at Biochemical Processing Division, NIIST (CSIR), Trivandrum.

RESEARCH SKILLS

Fifteen years research experience in the field of microbial enzyme production, enzymatic hydrolysis, antimicrobial activity of natural products, starch modification by enzymes, DNA and RNA isolation, cloning and expression of gene, primer designing, Biomedical Device development, Preparation of scaffolds and hydrogel, Histopathology, Biosoftening of plant fibers and bioremediation.

- ❖ Exposure to various laboratory techniques and analytical Methods (PCR, Cell culture, Histopathology, UV-Vis Spectrophotometer, Nanodrop, IR Spectroscopy, TGA, DSC, Electrophoresis etc)
- ❖ Computer skills (PowerPoint, Photoshop, MS Excel, Word and Internet)

WORK EXPERIENCE (21 years)

- 6 years 3 months Post Doctoral Research experience in SCTIMST, Thiruvananthapuram.
- 6 years teaching experience in Govt. College for Women, Thiruvananthapuram and Govt Arts & Science College Kozhinjampara, Palakkad

- Teaching experience in College of Agriculture, Vellayani, Thiruvananthapuram.
- 5 years work experience as Research Fellow in Dept. of Biotechnology in Kerala University, Kariavattom.
- 3 years research experience as Junior Project Fellow in Regional Research Laboratory (CSIR-NIIST) and Project Scientist at KSREC, Thiruvananthapuram.
- One year M.Phil.

Recent Achievements and Current Research

Based on a recent publication, Invited for a Talk at International Conference on Food Chemistry and Technology in Baltimore, USA.

Recent research focus on preparation of Scaffolds and formulations for Biomedical Devices, Enzyme isolation from microbial sources for various industrial applications.

PATENT

1. A method for the preparation of biosoftened plant nut husk fiber, T. Emilia Abraham, **Akhila Rajan** and Resmi. C. Senan. IPA No: 0392/DEL/2004/IN filed on 08-03-2004. The gazette of India 17, 2004 No-16, P-2434
2. Preparation of curcumin Incorporated cholecystic extracellular matrix hydrogel (CEMH) Formulations, Thapasimuthu Vijayamma Anilkumar, **Akhila Rajan**, Geetha Chandrika Surendran, Application No: 201841018156 / filed on 15/05/2018, Patent No. 550844 granted on 24/09/2024

PUBLICATIONS

1. D.R. Sobankumar, **Akhila Rajan**, J. Christudhas, Allen GnanaRaj. Process for the Extraction and Encapsulation of Curcumin in Nanoemulsion using Edible oils. International Journal of Advanced Scientific Research and Management, Volume 3 Issue 7, (2018), 11-15.
2. J. Muhamed, **Akhila Rajan**, Arun Surendran, Abdul Jaleel, T.V. Anilkumar. Comparative profiling of extractable proteins in extracellular matrices of porcine cholecyst and jejunum intended for preparation of tissue engineering scaffolds. J Biomed Mater Res B Appl Biomater. (2017), 105(3):489-496.
3. J. Muhamed, D. Revi, **Akhila Rajan**, Geetha CS, TV Anilkumar. Biocompatibility and

immunophenotypic characterization of a porcine cholecyst-derived scaffold implanted in rats. *Toxicologic Pathology* (2015), 43(4):536-45. doi: 10.1177/0192623314550722

4. **Akhila Rajan**, D.R. Sobankumar and A Jayakumaran Nair. Enrichment of ω -3 fatty acids in flax seed oil by alkaline lipase of *Aspergillus fumigatus* MTCC 9657. *International Journal of Food Science & Technology* 12/2013 DOI:10.1111/ijfs.12434. 49, Issue 5, (2014), 1337–1343.

5. D.Revi, V.P Vineetha, Jaseer Muhamed, Geetha C Surendran, **Akhila Rajan**, T.V. Kumary, T. V. Anilkumar. Wound healing potential of scaffolds prepared from porcine jejunum and urinary bladder by a non-detergent/enzymatic method. *Journal of Biomaterials Applications*, (2015), 29, 9, 1218-1229.

6. J. Muhamed, D. Revi, **Akhila Rajan**, TV Anilkumar. Comparative local immunogenic potential of three candidate xenografts prepared from porcine cholecyst, jejunum and urinary bladder in a rat subcutaneous model. *Journal of biomaterial application part B*. (2014), doi: 10.1002/jbm.b.33296.

7. T.V. Anilkumar, V.P. Vineetha, D. Revi, J.Muhamed, **Akhila Rajan**. Biomaterial properties of cholecyst-derived scaffold recovered by a nondetergent/enzymatic method. *Journal of Biomedical Materials Research Part B Applied Biomaterials*. (2014), 102(7):1506-16.

8. D. Revi, V.P. Vineetha, J.Muhamed, **Akhila Rajan**, T.V. Anilkumar. Porcine cholecyst-derived scaffold promotes full-thickness wound healing in rabbit. *Journal of Tissue Engineering*. 01/2013; 4:2041731413518060.

9. **Akhila Rajan**, D.R. Sobankumar and A. Jayakumaran Nair. Isolation of a novel alkaline lipase producing fungus *Aspergillus fumigatus* MTCC 9657 from aged and crude rice bran oil and quantification by HPTLC. *Int.J.Biol.Chem.*, (2011) 5:116-126.

10. **Akhila Rajan** and A Jayakumaran Nair. A comparative study on alkaline lipase production by a newly isolated *Aspergillus fumigatus* MTCC 9657 in submerged and solid state fermentation using economically and industrially feasible substrate. *Turk J Biol* 35 (2011) 569-574.

11. **Akhila Rajan**, Jayalakshmi.G and T. Emilia Abraham. Solid state production of Manganese peroxidases using arecanut husk as substrate. *Brazilian Archives of Biology and Technology*

(2010) 53: 555-562.

12. **Akhila Rajan**, J.D. Sudha, T. Emilia Abraham. Enzymatic modification of cassava starch by fungal lipase. *Industrial crops and products* 27(2008) 50–59.

13. **Akhila Rajan** and T.Emilia Abraham. Studies on crystallization and cross linking of lipase for biocatalysis. *Bioprocess Biosyst Eng* (2008) 31:87–94.

14. **Akhila Rajan** and T. Emilia Abraham Biosoftening of Coir Fiber-Process and Opportunities-Part 2. *Journal of Natural fibers* (2007) vol 4:1.

15. Beena Joy, **Akhila Rajan** and Emilia Abraham. Antimicrobial activity and chemical composition of essential oil from *Hedychium coronarium*. *Phytother. Res.* (2007) 21:439-443.

16. **Akhila Rajan** and T.Emilia Abraham. Enzymatic Modification of Cassava starch by bacterial lipase. *Bioprocess and Biosystems Engineering.* (2006) 29:65-71.

17. **Akhila Rajan**, V.S. Prasad and T.Emilia Abraham. Enzymatic esterification of starch using recovered coconut oil. *International Journal of Biological Macromolecules* 39. (2006) 265-272.

18. **Akhila Rajan** and T. Emilia Abraham. Biosoftening of Coir Fiber-Process and Opportunities-Part 1. *Journal of Natural fibers* (2006) vol 3:4.

19. **Akhila Rajan**, Jayalakshmi.G and T. Emilia Abraham. Biosoftening of areca nut fiber for value added products. *Biochemical Engineering Journal* (2005) 25: 237-242.

20. **Akhila Rajan**, Resmi C Senan, C.Pavithran and T. Emilia Abraham. Biosoftening of coir fiber using selected microorganisms. *Bioprocess Biosyst Eng* (2005) 28:165-173.

21. Resmi C Senan, T S. Shaffiqu, J. Jegan Roy, **Akhila Rajan** and P. Prema. Biodegradation of Dyes from Coir and Textile Effluents. *Coir News* (2002) 31, 2: 21-27.

Paper/Poster presentations in Conference

Akhila Rajan, Reshmi Raj and Anil kumar TV. “Preparation and characterization of a hydrogel formulation from cholecystic extracellular matrix for biomedical applications” Poster presentation in 30th Kerala Science Congress, held at Thalassery January 28-30, 2018

Akhila Rajan, Reshmi Raj and Anil kumar TV. “Development of a hydrogel formulation from

cholecystic extracellular matrix for biomedical applications” Poster presentation in 6th Asian Biomaterials Congress: ABMC6, held at Thiruvananthapuram October 25-27, 2017

Akhila Rajan and Anil kumar TV “Preparation and characterization of hydrogel formulations from cholecystic extracellular matrix for biomedical applications” Paper presentation in National Seminar on Frontiers in Biotechnology held at University of Kerala. March, 2017.

Deepa R, Jaseer M, **Akhila Rajan** and Anil kumar TV. “Comparative study of HaCaT cells on extracellular matrix scaffolds” Poster presentation in International conference on design of biomaterials held at IISc Bangalore December 2012.

Akhila Rajan and Emilia Abraham, T. “Crystallization and Cross linking of Lipase for biocatalysis” Paper presentation in National Seminar on Food Biotechnology and Bioenergy’ held at Thiruvananthapuram. March, 2006.

Akhila Rajan, C.K.Simi, J.Jegan Roy, L.V.Bindhu, K.Sangeetha, T.Emilia Abraham. ‘Crystallization and Cross linking of Enzymes – SEM studies’ Poster presented in the National Conference on Electron Microscopy (EMSI NC – 2006) held at Regional Research Laboratory (CSIR), Trivandrum April 19 – 21, 2006.

Akhila Rajan and Emilia Abraham, T. “A Study on Enzymatic Starch Esterification” Paper presentation in 8th International conference on polymers Macro 2004 held at Thiruvananthapuram December 2004.

Akhila Rajan and Emilia Abraham, T. “A Study on optimization and purification of Manganese peroxidase from *P.chrysosporium*” Poster presented in the International conference 10th FAOBMB Congress held at IISc Bangalore December 2003.

Work Shops Attended:

Four day workshop on “International Modular Courses in Toxicological Pathology” held at SCTIMST, Trivandrum from 8-11 February 2017.

Three day Workshop on “Research Methodology, Writing practices and Soft skills” held at Sastra Bhavan, Trivandrum on 3-5 February 2014.

Five day workshop on Bioinformatics at Department of Biochemistry, University of Kerala on Protein sequence alignment, Homology Modeling, Genome analysis.

REFERENCES

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