Biodata of the Scientist

Division/Section:__Crop Utilization

A.Personal information

1.Name(With Title): Dr. A. N. Jyothi

1.a. Qualification: Ph.D

2. Designation: Senior Scientist

3. Address(Personal): Sreesylam, VNRA-227, Vikas Nagar, Sreekariyam, Thiruvananthapuram, Kerala. PIN 695017

4. Phone Numbers:

(a) Residence+91 471 2590379 (b)Intercom (c)Mobile+91 471 9495339985

5. Email: sreejyothi_in@yahoo.com; jyothi.a.n@gmail.com

6. Countries visited: USA, The Netherlands, Switzerland, France, Belgium

B. Professional information

1. Area of specialization: Organic Chemistry

2. Area of interest: Starch and Polymer Chemistry

3. Number of institute projects completed (Add list): 3

1. Production and characterization of sweeteners, natural food additives and colourants from tuber crops (1999-2003).
2. Development of cassava starch based alternative gelling agents as substitute for agar in plant tissue culture media (2009-2010).
3. Physical modification of tuber starches for food and other industrial applications (2006-2011).

4. Number of Institute projects being handled (Add list): One
   1. Development of bioprocess for the production of functional oligosaccharides from tuber starches (2010-2013).
5. Number of externally funded projects completed (Add list): 1
   1. Graft copolymerization on to cassava starch and evaluation of the products' under the 'FAST Track Scheme for Young Scientists' of DST, Govt. of India, for the period July 2007 - July 2010.

6. Number of externally funded projects being handled (Add list): One
   1. Development, process optimization and characterization of superabsorbent polymers from cassava starch (August 2010- July 2013).

7. Number of students guided for a) Ph.D: b) M.Phil: Nil c) M.Sc: 5

8. Number of students being guided for a) Ph.D: 4 b) M.Phil: Nil c) M.Sc: Nil

8.a. information about the students under your guidance

Name of the student	Course undergoing (Ph.D/M.Phil/M. Sc)	Title of the project/Thesis	E-mail address
Parvathy Chandran, P	Ph.D	Starch based superabsorbent polymers: Synthesis, characterization and water sorption behaviour	parvathychandran86@gmail.com
Soumya B. Nair	Ph.D	Synthesis, characterization and application of some starch based composites and blends	soumyabhasker@gmail.com
Athira G. K	Ph.D	Development and studies on starch based polymer matrices as delivery systems for curcumin and some selected drugs	aathira207@gmail.com
Remya R.	Ph.D	Resistant starch: comparative evaluation in various starch sources, development by modification techniques and characterization in relation to structure and composition	remyasreepadam5@gmail.com

9. Information on guide ship

Guide ship for Ph.D/ M.Phil/ M.Sc	University	Subject
Ph.D	University of Kerala	Chemistry

10. Number of Research papers (Add list): 63

Papers in National Journals

International Papers

1. Soumya B. Nair and A. N. Jyothi. 2013. Cassava starch–konjac glucomannan biodegradable blend films: In vitro study as a matrix for controlled drug delivery, Starch/Stärke 65(3-4), 273–284.

2. M.S. Sajeev, J. Sreekumar, B. Vimala, S.N. Moorthy and A.N. Jyothi. 2012. Textural and Gelatinization Characteristics of White, Cream, and Orange Fleshed Sweet Potato Tubers (*Ipomoea Batatas* L.) International Journal of Food Properties, 15(4), 912-931.
3. P. C. Parvathy and **A. N. Jyothi**. 2012. Water sorption kinetics of superabsorbent hydrogels of saponified cassava starch-graft-poly(acrylamide), Starch/Stärke (In Press).
4. P. C. Parvathy and **A. N. Jyothi**. 2012. Synthesis, characterization and swelling behaviour of superabsorbent polymers from cassava starch-graft-poly(acrylamide), Starch/Stärke, 64(3), 207–218.
5. **A. N. Jyothi**, M. S. Sajeev, and J. Sreekumar. 2011. Hydrothermal modifications of tropical tuber starches - Effect of annealing on the physicochemical, rheological and gelatinization characteristics. *Starch/Stärke*, 63, 536-549.
6. **A. N. Jyothi**, M. S. Sajeev, P. C. Parvathy, and J. Sreekumar. 2011. Optimization of Synthesis and Characterization of Cassava Starch-graft-poly(Acrylonitrile) Using Response Surface Methodology, *Journal of Applied Polymer Science.* 122(3), 1546-1555.
7. Soumya B. Nair**, A. N. Jyothi,** M. S. Sajeev, R. S. Misra. 2011. Rheological, Mechanical and Moisture Sorption Characteristics of Cassava Starch-Konjac glucomannan Blend Films. *Starch/Stärke*, 63, 728-739.
8. **A. N. Jyothi**, J. Sreekumar, S. N. Moorthy and M. S. Sajeev. 2010. Response Surface Methodology for the Optimization and Characterization of Cassava Starch-graft-poly(acrylamide), Starch/Stärke, 62, 18-27.
9. **A. N. Jyothi**, 2010. Starch graft copolymers- Novel applications in industry. *Composite Interfaces*, 17, 2010, 165-174.
10. **A. N. Jyothi**, M. S. Sajeev, and J. Sreekumar. Hydrothermal modifications of tropical tuber starches 1. Effect of heat-moisture treatment on the physicochemical, rheological and gelatinization characteristics of tuber starches, *Starch/Stärke* 62, 2010, 28-40.
11. **A. N. Jyothi,** M. S. Sajeev, S. N. Moorthy, J. Sreekumar. Effect of graft-copolymerization with poly(acrylamide) on the thermal and rheological properties of cassava starch, *Journal of Applied Polymer Science*, 116(1), 2010, 337-346.
12. **A. N. Jyothi,** J. T. Sheriff, M. S. Sajeev. Physical and Functional Properties of Arrowroot Starch Extrudates, *Journal of Food Science*, 74(2), 2009, p. E97-E104.
13. **A. N. Jyothi**, K. Sasi Kiran, B.Wilson, S. N. Moorthy, Bala Nambisan. Wet storage of cassava starch: Use of sodium metabisulphite and acetic acid and the effect on starch properties, *Starch/Stärke* 59 (3-4), 2007, 141-148.
14. **A. N.** Jyothi, S. N. Moorthy, J. Sreekumar, K. N. Rajasekharan. Studies on the properties of citrate derivatives of cassava (*Manihot esculenta* Crantz) starch synthesized by microwave technique, *Journal of the Science of Food and Agriculture,* 87, (5), 2007, 871-879.
15. **A. N. Jyothi**, S. N. Moorthy, K. N. Rajasekharan. Studies on the synthesis and properties of hydroxypropyl derivatives of cassava (*Manihot esculenta* Crantz) starch, *Journal of the Science of Food and Agriculture*, 87 (10), 2007, 1964-1972.

16. **A. N. Jyothi**, S. N. Moorthy, K. N. Rajasekharan. Effect of cross-linking with epichlorohydrin on the properties of cassava (*Manihot esculenta* Cranz) starch, *Starch/ Stärke*, 2006, 58(6), 292-299.
17. **A. N. Jyothi**, K. N. Rajasekharan, S. N. Moorthy, J. Sreekumar. Microwave- assisted synthesis and characterization of succinate derivatives of cassava (*Manihot esculenta* Crantz) starch, *Starch/Starke*, 57(11), 2005, 556-563.
18. **A. N. Jyothi**, K. Sasikiran, M. S. Sajeev, R. Revamma, S. N. Moorthy. Gelatinisation properties of cassava starch in the presence of salts, acids and oxidising agents, *Starch/Starke*, 2005, 57 (11), 547-556.
19. **A. N. Jyothi**., B. Wilson, S. N. Moorthy, Mathew George. The Physico-chemical properties of the starchy flour extracted from Sweet potato tubers through lactic acid fermentation, *Journal of the Science of Food and Agriculture,* 2005, 85, 1558-1563.
20. **A. N. Jyothi**, K. N. Rajasekharan, S. N. Moorthy, J. Sreekumar. Synthesis and characterization of low DS succinate derivatives of cassava (*Manihot esculenta* Crantz) starch, *Starch/Starke*, 2005, 57 (7), 319-324.
21. **A. N. Jyothi**, S. N. Moorthy, C. S. Eswariamma. Anthocyanins in Sweet potato leaves – varietal screening, growth phase studies and stability in a model system, *International Journal of Food Properties*, 2005, 8 (2), 221-232.
22. **A. N. Jyothi**, K. Sasikiran, Bala Nambisan and C. Balagopalan. Optimisation of glutamic acid production from cassava starch factory residues using *Brevibacterium Divaricatum, Process Biochemistry*, 2005, 40(11), 3576-3579.
23. **A. N. Jyothi**., S. N. Moorthy and B. Vimala. Physicochemical and Functional Properties of Starch extracted from two Species of *Curcuma. International Journal of Food Properties*, 2003, 6(1), 135-145.
24. **A. N. Jyothi**., M. S. Sajeev and K. N. Rajasekharan. Effect of microwave-assisted heat-moisture treatment on the properties of cassava (*Manihot esculenta* Crantz) Starch. *Journal of Science, Technology and Management*, 3(3), 2010, 15-28.
25. P. Parvathy Chandran and **A. N. Jyothi**. Adsorption of heavy metal ions by starch based superabsprbent polymer. *Journal of Science, Technology and Management*, 3(3), 2010, 5-8.
26. Soumya B. Nair and **A. N. Jyothi**. Evaluation of rheological and flocculation properties of starch-graft-poly(methacrylamide) copolymers. *Journal of Science, Technology and Management,* 3(2), 2010, 5-14.
27. **A. N. Jyothi.** A superabsorbent polymer from cassava starch based graft copolymer, *CTCRI News*, 26(1), January-March 2009.
28. **A. N. Jyothi**, M. S. Sajeev, S. N. Moorthy, J. Sreekumar, K. N. Rajasekharan. Microwave-assisted synthesis of cassava starch phosphates and their characterization, *Journal of Root Crops,* 34(1), 2008, 34-42.
29. **A. N. Jyothi**. Novel techniques in the synthesis of modified starches from cassava - Application of microwave heating and phase transfer catalysis, *CTCRI News*, 25(1), January-March 2008, pp. 2-3.

30. **A. N. Jyothi**, J. Sreekumar, Santhosh Mithra. Showcasing CTCRI Technologies – Folder- Malayalam Translation, 2008.

31. **A. N. Jyothi**, S. N. Moorthy, K. N. Rajasekharan. Synthesis and characterization of dodecenyl derivatives of cassava starch, *Journal of Root Crops,* 2006, 32(2), 107-114.

32. **A. N. Jyothi**. Standardisation of Process for the Production of Maltodextrins from Sweet Potato Flour, *Journal of Root Crops,* 2003, 29 (1), 20-23.

33. **A. N. Jyothi** and S. N. Moorthy. Effect of Formaldehyde Concentration on Cross-linking and Pasting Properties of Cassava Starch, *Journal of Root Crops,* 2002, 28 (2), 36-41.

34. **A. N. Jyothi,** C. Balagopalan and S. N. Moorthy, 2001. Utilization of cassava residue for the production of maltodextrins and L-glutamic acid. In: Trends in Carbohydrate Chemistry, Vol. 8, pp. 175-180.
35. **A. N. Jyothi** and S. N. Moorthy, 2008. Modified Tuber Starches in Industry (Folder) prepared in connection with the Scientist-Entrepreneur Interface organized by the Division of Crop Utilization, CTCRI.
36. S. N. Moorthy, G. Padmaja and **A. N. Jyothi.** Value added Products from Tuber Crops, Kisan World , 33(11), November 2006, 29-32.
37. Lila Babu and **A. N. Jyothi.** How do Tuber Crops Fare in Nutritive Value? Kisan World, 33(12), December 2006, 33-35.

Conferences/Symposia/Proceedings

38. **A. N. Jyothi**, G. Padmaja and G. Suja. Enzymatic Debranching of Starch: Comparison between Cassava and Potato Starches in relation to Resistant Starch Formation. In: Proceedings of National Carbohydrate Conference (CARBO-XXVII) held at CFTRI, Mysore during 13-15 December 2012.

39. M. S. Sajeev, **A. N. Jyothi** and J. T. Sheriff. Development of biodegradable films from cassava starch- clay nanocomposites In Proceedings of 3rd International Conference of Food Technology (ISBN 1-0, 978-81-926250-0-3), 4-5, October, 2013, IICPT, Thanjavoor.

40. **A. N. Jyothi**. Starch: A Versatile Natural Carbohydrate for Exploitation in the Development of Novel Functional Polymeric Materials. Invited paper presented in the National Seminar on Frontiers in Chemistry (NSFC-2012) during 25-27 April 2012 at Department of Chemistry, University of Kerala, Thiruvananthapuram.

41. Parvathy Chandran P and **A. N. Jyothi**. Synthesis and Characterization of Cassava Starch based Superabsorbent Polymers. Paper presented in the National Seminar on Frontiers in Chemistry (NSFC-2012) during 25-27 April 2012 at Department of Chemistry, University of Kerala, Thiruvananthapuram.

42. G. K. Athira and **A. N. Jyothi**. Synthesis of Starch Nanoparticles (SNP)- Different Approaches. Paper presented in the National Seminar on Frontiers in Chemistry (NSFC-2012) during 25-27 April 2012 at Department of Chemistry, University of Kerala, Thiruvananthapuram.

43. A. N. Jyothi, P. Parvathy Chandran, Soumya B Nair and G. Suja. Starch-based Biodegradable Composites: Scope in Controlled Delivery Systems and Packaging Applications. Invited paper presented in the Third International Multicomponent Conference held at Mahatma Gandhi University, Kottayam, 23-25 March, 2012.

44. Parvathy Chandran P., and A. N. Jyothi. Starch based superabsorbent polymers: thermal and rheological properties, paper presented in the Third International Multicomponent Conference held at Mahatma Gandhi University, Kottayam, 23-25 March, 2012.

45. Soumya B Nair, M. S. Sajeev and A.N. Jyothi. Rheological and Mechanical Properties of Thermoplastic Cassava Starch- clay composites. Paper presented in the Third International Multicomponent Conference held at Mahatma Gandhi University, Kottayam, 23-25 March, 2012.
46. Parvathy Chandran P., and **A. N. Jyothi**. Saponified cassava starch-graft-poly(acrylamide) superabsorbent hydrogel as a potential soil moisture conditioner. Paper presented in 23rd Kerala Science Congress, Thiruvanathapuram, 2011.
47. P. Parvathy Chandran, K. Susan John and **A. N. Jyothi**. Cassava starch based biodegradable superabsorbent hydrogel as a soil additive for moisture retention. Paper presented in National Seminar on Climate Change and Food Security: Challenges and Opportunities for Tuber Crops (NSCFST) during 20-22 January 2011 at Central Tuber Crops Research Institute, Thiruvananthapuram, Kerala.

48. Soumya P. S. and **A.N. Jyothi.** Water sorption studies of highly water absorbing hydrogels of cassava starch-graft-poly(acrylic acid). Paper presented in National Seminar on Climate Change and Food Security: Challenges and Opportunities for Tuber Crops (NSCFST) during 20-22 January 2011 at Central Tuber Crops Research Institute, Thiruvananthapuram, Kerala.

49. Soumya B Nair, M. S. Sajeev, R. S. Misra, and **A. N. Jyothi**. Rheological and Mechanical Properties of Cassava Starch- Konjac Glucomannan blend films. Paper presented in National Seminar on Climate Change and Food Security: Challenges and Opportunities for Tuber Crops (NSCFST) during 20-22 January 2011 at Central Tuber Crops Research Institute, Thiruvananthapuram, Kerala.

50. **A. N. Jyothi**, M. S. Sajeev, Soumya B Nair and P. Parvathy Chandran. Scope of cassava starch based polymer composites as slow release matrices for agricultural and pharmaceutical applications. Paper presented in National Seminar on Climate Change and Food Security: Challenges and Opportunities for Tuber Crops (NSCFST) during 20-22 January 2011 at Central Tuber Crops Research Institute, Thiruvananthapuram, Kerala.

51. Parvathy Chandran. P. and **A. N. Jyothi.** Starch-based Superabsorbent Polymers: Studies on Water Absorption and Thermal Properties. Paper presented in International Conference on Material Science and Technology (ICMST) held at Thiruvananthapuram during October 29-31, 2010.
52. Soumya B. Nair and **A. N. Jyothi**. Characterization of Biodegradable Edible Blend Films from Cassava Starch and Konjac glucomannan. Paper presented in International Conference on Material Science and Technology (ICMST) held at Thiruvananthapuram during October 29-31, 2010.
53. **A. N. Jyothi.** Starch- A versatile natural alternative for the development of biodegradable polymer materials. Invited paper presented in International Conference on Material Science and Technology (ICMST) held at Thiruvananthapuram during October 29-31, 2010.

54. **A. N. Jyothi**, P. Parvathy Chandran, M. S. Sajeev and S. N. Moorthy, Structural and functional characteristics of highly water absorbing hydrogels from graft copolymers of cassava starch. Paper presented at 24th carbohydrate conference organized by ACCT (I), at Jodhpur, Rajasthan during 7-9 December 2009.
55. S. N. Moorthy and **A. N. Jyothi**, 2008. Starch and starch based industrial products. In: Proceedings of Scientist-Entrepreneur Interface-Value addition technologies for tropical tuber crops, held at CTCRI during 12th August 2008.

56. **A. N. Jyothi**, 2008. Starch graft copolymers-Novel applications in industry. Invited lecture presented in Second International Conference on Polymer Blends, Composites, IPNs, Membranes, Poly Electrolytes and Gels : Macro to Nano Scales (ICBC – 2008), September 22-24, 2008, Kottayam, Kerala, India.

57. **A. N. Jyothi**, K. N. Rajasekharan and S. N. Moorthy, 2006. Microwave-assisted esterification of cassava starch. Paper presented at the 14th Triennial Symposium of the International Society for Tropical Root Crops, held at Thiruvananthapuram, Kerala, India, during 20-26 November, 2006.
58. **A. N. Jyothi**, K. N. Rajasekharan, S. N. Moorthy and J. Sreekumar, 2005. Preparation and characterization of phosphorylated derivatives of cassava starch by microwave technique. Paper presented at National Seminar on achievements and opportunities in Post harvest management and value addition in Root and Tuber crops (NSRTC 2), held at Thiruvananthapuram, Kerala, India, during 19-20 July, 2005.
59. **A. N. Jyothi** and S. N. Moorthy, 2002. Production and Potential of Maltodextrins from Tuber crops. Paper presented at XII Swadeshi Science Congress, Thiruvananthapuram, 5-7 November 2002.
60. **A. N. Jyothi**, S. N. Moorthy and C. S. Eswariamma 2002. Sweet potato leaves – A potential source of anthocyanins as natural food colours. In: Abstracts of Invited and Contributed Papers, International Conference on Vegetables, 11-14, November, 2002, Bangalore.
61. S. N Moorthy., **A. N. Jyothi**., and G. Padmaja. 2002. Value addition of Tuber Crops by Processing. In: Abstracts of Invited and Contributed Papers, International Conference on Vegetables, 11-14, November, 2002, Bangalore.

62. S. K. Nanda., **A. N. Jyothi** and C. Balagopalan. 2002. Cassava Waste Treatment and Residue Management in India. 7Th Regional Cassava Research Workshop held at Bangkok (Abstracts).
63. **A. N**. **Jyothi** and S. N. Moorthy, 2001. Improvement of Rheological Characteristics of Cassava Starch by Chemical Modifications. In: Proceedings of Thirteenth Kerala Science Congress held at Trichur, 2001.

11. Number of Books/Book chapters (Add list): 3

1. G. Padmaja and **A. N. Jyothi.** Roots and Tubers, In: Valorization of Food Processing By-products (Ed. M. Chandrasekaran), CRC Press, Taylor & Francis Group, Boca Raton, Florida, 2013, pp 378-414.
2. **A. N. Jyothi** and Antonio J. F. Carvalho. Starch-g-copolymers: Synthesis, Properties and Applications, In: Polysaccharide based graft copolymers, (Eds. S. Kalia and M. W. Sabaa), Springer-Verlag GmbH, Berlin, Heidelberg, 2013 (In Press).
3. **A.N. Jyothi**, M.S. Sajeev, G. Padmaja and S.K. Naskar, Biodegradable Nanocomposite Materials for Food Packaging, In: Nanotechnology in Agriculture (Eds: Singh, H.P. Anilkumar and Parthasarathy, V. A.), Westville Publishers, New Delhi, 2012.

12. Number of Technical Bulletins (Add list): 1

A. N. Jyothi and S. N. Moorthy, 2012. Modified Tuber Starches, CTCRI Technical Bulletin series No. 52.

13. Consultancies offered (Add list and give a brief description):

14. Technologies developed (Add list and give a brief description):

- Production of maltooligosaccharides by enzymatic techniques.
- Standradization of processes for the chemical modifications of starch for food and non food applications: cross-linking, acetylation, succinylation, esterification by citric acid, phosphorylation, pyrodextrinization, oxidization, hydroxypropylation, hydrophobic starches.
- Standardization of processes for the physical modification of starch: heat-moisture treatment, annealing, steam-pressure treatment, microwave treatment, drum drying, extrusion.
- Microwave technique and phase transfer catalysis for dry-phase starch modification reactions.
- Technology for the wet storage of cassava starch.
- Chemical treatments to improve the whiteness of the cassava starch.
- Graft copolymerization on to cassava starch: synthesis of starch-graft-copolymers using vinyl monomers and their structural and functional characterization, application in heavy metal ion removal and textile sizing.

- Synthesis and characterization of starch based, environmental friendly superabsorbent polymers for utilization in agriculture for water conservation and also for incorporation in personal care products.
- Starch based polymer composites, nanocomposites and biodegradable films for packaging and pharmaceutical applications.
- Optimization of synthesis of maltodextrins and maltose from starch and starch factory residues by enzyme and acid hydrolysis.
- Synthesis of L-glutamic acid from starch and cassava starch factory residues using *Brevibacterium divaricatum* by submerged fermentation.
- Extraction, characterization and stability studies of sweet potato leaf anthocyanins.

15. Patents/Copyrights obtained (Add list and give a brief description):

16. Any other information: