

Resume

Professor A. J. Varma

Affiliation:

Dr. A.J.Varma, Ph.D. (New York & Syracuse), FBRS, FACCTI
Dean (Research & Academic Affairs)
Dean (School of Chemical Sciences) and Professor & Head, Chemistry Department
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Former Chairman, Department of Polymer Science & Engineering
CSIR - National Chemical Laboratory, Pune

Member, Scientific Panel, Ministry of Health & Family Welfare
Executive Member, Association of Carbohydrate Chemists & Technologists (India)
Editorial Board, Carbohydrate Polymers (Elsevier, UK)
Editorial Board, Trends in Carbohydrate Research (India)
Former President, Society of Polymer Science of India (Pune Chap.)
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Executive Summary :

- *Fellow of Association of Carbohydrate Chemists (India) (2014)*
- *Fellow of Biotech Research Society of India for outstanding contributions to Industrial Biotechnology (Thiruvananthapuram, Nov., 2011)*
- *CSIR-NCL Scientist-of-the-year Award 2011 for outstanding research (Jan., 2012)*
- *Life-time Achievement Award in Cellulose Chemistry and Technology by Association of Carbohydrate Chemists & Technologists of India, (Dehra Dun, Jan., 2014)*
- *Professor B.D. Tilak Visiting Fellowship by ICT, Mumbai (Mumbai, 2013-14)*
- *National VASVIK Industrial Technology Award winner for Chemical Technology transferred to Indian Industry (Gujarat, Oct.,2011)*
- *UNIDO-ICS Expert Group Member on Biomass Valorization (Italy, 2006-2011)*
- *Professor S.Sethna Visiting Professor at Sardar Patel University (Anand, 2005)*
- *Editorial Board Member of Elsevier Jour. "Carbohydrate Polymers" (UK) (2004-contd)*
- *Editorial Board Member of "Trends in Carbohydrate Research" (India) (2009-contd.)*
- *President, Society of Polymer Science (India) (Pune Chapter) (2009-2014)*
- *Invited Speaker and Chairperson at Symposia in many countries- USA, UK, Germany, Italy, China, Turkey, Denmark, Egypt, France, Sweden, Denmark,S. Africa, (1995-2011)*
- *Invited to deliver "Distinguished Alumni Lecture" in State University of New York, USA (2000)*

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- *Transferred high value technologies to industry, industrial consultant to many industries, led large industrial & basic research projects, selected as nodal officer of CSIR Biomass Program (2012-2017)*
- *Press reports in several national and international newspapers, magazines, and technical journals for work done by his group.*
- *Member of Scientific Panels, FSSAI - Ministry of Health, Ministry of New & Renewable Energy, DBT-BIRAC, DST, CSIR*

Personal : Born Lucknow, India, November 17, 1952

Education : **Ph.D.**, State University of New York, Syracuse, New York, USA, (1979).

Ph.D., Syracuse University, New York, USA, (1979)

Post-doctoral Research, State Univ. of New York, USA (1979-1980)

B.Sc. (Hons, Chemistry), Fergusson College, Pune, (1973)

Papers / Patents : 100+ papers and 12 patents; 4 technologies transferred.

Research Experience and Interests :

- Sustainable Chemical Science
- Polymer Chemistry, Polymer Materials and Polymer Technology.
- Nanotechnology of Polymers,
- Cellulose and Nanocellulose
- Biomass Platforms and Renewable Materials Building Blocks.
- Developing research methodology for sustainable products from Biomass by synergizing biotechnology and chemical methodologies
- Lead a large interdisciplinary teams of scientists (organic chemistry, polymer chemistry, biotechnology, process development) for concept-to-product chemicals delivery.

Details of Major Awards, Honors, Recognitions :

1. **Elected as Fellow of** Association of Carbohydrate Chemists & Technologists (India) for outstanding contributions to Cellulose Chemistry and Technology **(29 December, 2014)**
2. **“Life-time Achievement Award”** by Association of Carbohydrate Chemists & Technologists of India for contributions to Cellulose Chemistry and Technology **(20 Jan., 2014)**
3. **“Professor B.D.Tilak Visiting Fellowship Endowment”** for the year 2013-2014 **(03 Dec. 2013)**

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4. **NCL Scientist-of-the-Year Award** given by NCL Research Foundation for outstanding work on Biodegradable Polymers and Biomass Fractionation Technology **(03 January, 2012)**

The Biomass Fractionation Technology has also been selected as being amongst the Top 10 High Impact Technologies of CSIR-NCL since inception of NCL, during the 70th. Anniversary of CSIR in 2012.
5. **Elected as Fellow of Biotech Research Society of India** for outstanding contributions to advancement of Industrial Biotechnology **(21 November, 2011)**
6. **Certificate of Appreciation from American Chemical Society Publications** for valuable contribution and dedicated service in peer review for ACS Journals **(December 2011)**
7. **VASVIK Award** for Chemical Sciences & Technology (2008) for work leading to a multi-purpose biorefinery and for technology development of a new high-pressure steam process to get value-added cellulose, hemicelluloses and lignin from biomass **(Oct. 2010)**
8. **Director's Commendation Award at NCL Foundation Day** for successfully commissioning a demonstration plant on waste biomass to value-added polymers **(January 2008)**
9. Invited and serving as **Editorial Board Member** of prestigious international scientific journal in chemistry "**Carbohydrate Polymers**" (Elsevier Press, UK) **(2004 - 2012, continuing)**
10. Invited and serving as **Editorial Board Member** of "Trends in carbohydrate Research" (India) **(2009 –Continuing till date)**
11. **Elected as President, Society of Polymer Science, India (Pune Chapter) (July 2009, continuing till date)**
12. **Elected as Executive BodyMember, Association of Carbohydrate Chemists & Technologists (India) (Jan. 2014)**
13. Professor S.Sethna **Visiting Professor in Chemistry** at Sardar Patel University (2004)
14. **University Grants Commission Expert Member** for setting up Center of Excellence in Applied Polymers at Sardar Patel University, Gujarat (2004-2006)
15. **Expert Group Member** Meeting on Evaluation of Forefront Technologies in Environmentally Degradable Polymers, ICS-UNIDO, Italy **(2005, 2009)**
16. **Session Chairman and invited lecture** at International Conference, Trieste Italy **(2008, 2009)**
17. **Session Chairman and invited lecture** at International Conference Cairo, Egypt **(2008),**
18. **Invited lecture** at Beijing, China for Conf. on **Green Materials for Green Olympics (Oct. 2007)**
19. **Invited to organize** International Conference on "Sustainable Plastics for India and Asian Countries" by ICS-UNIDO, at NCL, Pune, **(2006)**
20. **Specially invited speaker at scientific fora / conferences in (1995 – 2008)**
USA, UK, Germany, Sweden, Denmark, Turkey, France, China, Egypt, Italy, India

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21. Invited to deliver “**Distinguished Alumni Lecture**” at College of Environmental Science and Forestry, **State University of New York, USA (2000)**
22. **Nine scientific publications selected as Top 10 papers of prestigious research journals** like “JCS ChemComm”, “Green Chemistry”, and “Carbohydrate Polymers”, (2002- 2009)
23. **Article in “Nature”** high-lighted work done by Dr.Varma (2003) on biodegradable polymers synthesis strategy
24. **Chairman and member of several committees at local and national level** (UGC Experts Committee)
25. **Member of Scientific Panel of FSSAI, Ministry of Health**
26. **Member of Scientific Panel of Project Evaluations, MNRE**
27. **Member of Scientific Panel of Project Evaluations, DST**
28. **Member of Scientific Panel of Project Evaluations, DBT-BIRAC**
29. **Member of Scientific Panel of Project Evaluations, CSIR**
30. **Member of UNIDO Experts Committee on Valorization of Biomass and Environmentally Degradable Polymers (2005-2011)**
31. Chairman of Purchase Committee of NCL
32. Member of CSIR SRF Committee
33. Member of selection committees for scientists and staff
34. Represented NCL/CSIR at Planning Commission meeting, Jan. 2008, etc.)
35. **MRF Award for Best scientific & technological work in elastomers in India (1988)**
36. **Award of Research Foundation of New York for Ph.D. (1974-1979)**
37. **Award of Research Foundation of New York for Post-doctoral Research (1980-1981)**
38. **National Science Talent Search Scholar of India (1971-74)**
39. Basic and Applied work done in Dr. Varma’s lab has been **highlighted in several National and International newspapers, magazines, and technical journals**
40. **Member of Scientific Panels** of Food Safety and Security Authority of India, Ministry of Health, Delhi (2014-15), Ministry of New & Renewable Energy (MNRE), and DBT-BIRAC
41. **Member of High Power Government Delegation** to Mauritius to discuss scientific cooperation between India and Mauritius

Papers chosen as hottest “Top 10” papers of respective journals published by Dr.A.J.Varma in the last 10 years

- 1) Towards biodegradable polyolefins : strategy of anchoring minute quantities of monosaccharides and disaccharides onto functionalized polystyrene, and their effect on facilitating polymer biodegradation
P. Galgali, **A.J.Varma**, U.S.Puntambekar, and D.V.Gokhale
JCS ChemComm, 23, 2884-2885 (2002)
- 2) Lactic acid production from waste sugarcane bagasse derived cellulose
Mukund G. Adsul, **Anjani J. Varma** and Digambar V. Gokhale, *Green Chem.*, 2007, **9**, 58
- 3) Utilization of sugarcane bagasse cellulose for producing cellulose acetates: Novel use of residual hemicellulose as plasticizer
H.M.Shaikh, K.V.Pandare, G.Nair, and **A.J.Varma**
Carbohydrate Polymers, 76, 23-29 (2009)
- 4) Complexation of heavy metals by crosslinked chitin and its deacetylated derivatives
K.D.Trimukhe and **A.J.Varma**
Carbohydrate Polym., 71, 66-73 (2008)
- 5) Metal complexation by chitosan and its derivatives: A review
Varma, A.J., Deshpande, S.V., Kennedy, J.F.
(2004) Carbohydrate Polymers, 55 (1), pp. 77-93.
(All-time highest rated review paper in this journal)
- 6) Synthetic Polymers Functionalized by Carbohydrates: A Review
A.J.Varma, P.Galgali, and J.F.Kennedy
Carbohydr. Polym. 56(4), 429-446, (2004)
- 7) Enzymatic hydrolysis of delignified bagasse polysaccharides
M.G.Adsul, J.E.Ghule, R.Singh, H.Shaikh,K.B.Bastawde, D.V.Gokhale, and **A.J.Varma**
Carbohydr. Polym. 62(1), 6-10 (2005)
- 8) Lignin-carbohydrate complexes from sugarcanebagasse : preparation, purification, and characterization
R. Singh, S. Singh, K. D. Trimukhe, K. V. Pandare,K. B. Bastawade, D. V. Gokhale, and **A. J. Varma**
Carbohydr. Polym. 62(1), 57-66 (2005)
- 9) Polysaccharides from Bagasse : Applications in Cellulase and Xylanase Production
M. G. Adsul, J.E. Ghule, R. Singh, H. Shaikh,K.B. Bastawde, D.V. Gokhale,
A.J. Varma,
Carbohydr. Polym. 57(1),67-72, (2004)

Thesis Supervised (Ph.D, M.Sc., M.Tech., B.Tech. degrees)

1. Pretreatment of Biomass for ethanol production
Ph.D. thesis in progress, S.Pal (to be submitted June 2017)
2. Functionalized nanoparticles from cellulose
Ph.D. Thesis, P.R. Sharma, CSIR Academy (29 September, 2014)
3. Isolations, purifications, and applications of cellulose derived from bagasse and study of dialdehyde cellulose
Ph.D. Thesis, H. Shaikh, Pune University, (Jan. 21, 2011)
4. Synthesis and study of biodegradable elastomers
Ph.D.Thesis, R. Singh, Pune University, (Dec 31, 2010)
5. Crosslinking reactions of chitosan and their applications
Ph.D. Thesis, K D Trimukhe, (April 10, 2009)
6. Biodegradable Polymers Based on Naturally Occurring Substances
Ph.D. Thesis, P. Galgali, Pune University (December 2004)
7. Structural studies, reactions and applications of oxidised celluloses
Ph. D. Thesis, V B Chavan, Pune University (1995)
8. Cellulose and Lignin as binder material and electrodes in Lithium Ion Batteries,
Ph.D. thesis, T. Nirmale (in progress, Pune University, completion June. 2018)
9. Synthesis and properties on shape selective nanoparticles of cellulose derivatives
Ph.D. thesis, Oval Yadav, (in progress, Central University of Haryana, June 2020)
10. Preparation of metallic nanoparticles and their polymer composites
M.Tech Thesis, Ayushi Kamalkar, VIT, Vellore, (June 2016)
11. Preparation and characterization of oxidized cellulose,
M.Sc. Thesis, Baljeet, Central University of Haryana, May 2016.
12. Studies on oxidation chemistry with special reference to cellulose
M.Sc. Thesis, Rajnish, Central University of Haryana, May 2016.
13. Studies of selective oxidation of hydroxyl groups on cellulose
M.Sc. Thesis, Kusum, Central University of Haryana, May 2016.
14. Oxidation chemistry of carbohydrates
M.Sc. Thesis, Akanksha, Central University of Haryana, May 2016.
15. Oxidation chemistry of cellulose
M.Sc. Thesis, Mona Yadav, Central University of Haryana, May 2016

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16. Incorporating antimicrobial properties on biodegradable polymer polyvinyl alcohol films by blending with silver nanoparticles and polyethylenimine
Preeti Singh, M.Sc. (Biotechnology Thesis, Banasthali University), June 2015
17. A strategy to develop anti-microbial biodegradable polymers for agricultural applications:studies with cellulose acetate
Parul Trivedi, M.Sc. (Biotechnology Thesis, Banasthali University), June 2015
18. Antimicrobial properties of carboxymethyl cellulose (cmc)-a biodegradable polymer impregnated with silvernanoparticles and polyethyleneimine
Deepshikha Buwade, M.Sc. (Biotechnology Thesis, Barkatullah Univ.), June 2015
19. Antibacterial materials from Biobased Materials
M.Tech. Thesis, S. Dutta, Manipal Inst. Of Technology (May 2014)
20. Studies in dispersion stability of carbon nanotubes in the presence of series of synthetic and natural polymers, preparation of their Nanocomposites, and evaluation of surface electrical conductivity
M.Tech. Thesis, Neelam Aliya, Centre of Converging Technologies, University of Rajasthan, Jaipur (May 2014)
21. Preparation of Nanocellulose from Cotton linters
B.Tech. thesis, Yadwinder Singh, Sri Guru Granth Sahib World University, Punjab (Aug. 2014)
22. Plastics degradation,
BE Thesis, P Bhadane and A Surana, PRE College, Pune University (1998)
23. Blends of starch and PET as Biodegradable Polymers
BE Thesis, P G Deshpande, N M Chaudhari, and A Paradkar, MIT College, Pune University (1998)
24. Jute and Thermoplastic Polymer Blends/Composites
B.E. Thesis, A Venkataraman and A Rawal, MIT College, Pune University (1999)
25. Blending of Jute and Polystyrene
B.Tech. Thesis, G Ninad, Dr. Babasaheb Ambedkar Tech. University, Lonere (2000)
26. Multiphase polymers – Jute / Polystyrene Blends,
BE Thesis, Y Parulekar, P mathur, and R Arora, MIT College, Pune University (2000)
27. A study of functionalized synthetic polymer and natural polymer blends
BE Thesis, R Shevde, P Deore, and N Bhandarkar, MIT College, Pune University (2003)
28. Comparison of a biocatalyst with a chemical catalyst in carrying out esterification reactions
M.Sc.Thesis, A Paul, Abeda Inamdar Sr.College, Pune University (2006)

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29. Blends of chlorinated elastomers
B E Thesis, S C Manwani, A J Padmanabhan, and K V
Koundinya, Maharashtra Institute of Technology, Pune University (1990)

Countries Visited : Brief Description

Invited to deliver invited lectures at several international fora / conferences / meetings worldwide (last 10 years): (partial list)

- **USA (2015):** Invited talk and Session Chair of ACS Pacificchem 2015 Conference on Lignocellulose Chemistry
- **Italy (2011) :** Invited to be part of Expert Group on Biomass Valorization discussion group.
- **Mauritius (2010) :** Member of High Power Delegation of Government of India to discuss bilateral S & T Cooperation
- **Italy (2009)** Invited to give lecture at ICS-UNIDO Conference on Biofuels and chair a session (21-23 April 2009)
- **Italy (2008) :** Invited to give lecture at ICS-UNIDO Conference on Biofuels and chair a session (18-20 September 2008)
- **Egypt (2008) :** Session chairman and invited lecture at UNIDO Conference at Cairo, Egypt (29-30 March 2008)
- **China (2007) :** Invited lecture “Biomass based Green Economy for Future Generations” at the International Conference on “Green Materials for Green Materials” sponsored by ICS-UNIDO, (26-29 Oct. 2007)
- **India (2006) :** Invited lecture, Carbohydrate Conference of Association of Carbohydrate Chemists and Technologists, New Delhi
- **Italy (2005) :** Expert Group Meeting of UNIDO - ICS to discuss status of Environmentally Degradable Polymers, and for invited lecture “Country Report on Promotion of Sustainable Plastics use and EDP’s in India” (5 Dec. 2005)
- **India (2005) :** Invited lecture, ICAR Conference on Roots and Tuber Crops, Trivandrum (July 2005)
- **India (2004) :** 1. Invited lecture, All-India Plastic Manufacturers Research Association, lecture on Biodegradable Polymers 2. Invited lecture, Carbohydrate Conference of Association of Carbohydrate Chemists and Technologists, Dehra Dun
- **India (2003) :** Invited lecture at Indo-French Symposium under IFCPAR, Synthesis of renewable resources based biodegradable polymers, Feb. 12, 2003
- **India (2001): Invited talk entitled** “Prospects for Biodegradable Plastics based on Utilization of Renewable Resource Polymers”, International Conf. in New Delhi, Ministry of Environments and Forestry
- **Denmark (2000), Special invitation** to discuss collaborative research and to give invited lecture “Modified Natural Polymers and their Applications”, at Agricultural University in Copenhagen (2-4 April, 2000)

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- **USA (2000), special invitation as Distinguished Alumni Lecture Series, gave lecture “Environment-friendly Natural Polymer Composites” (7 April 2000)**
- **USA (2000)**, attended conference on Building Blocks from Wood, gave research poster on “Cellulose powder as a component of thermoset resins : characterization, functionalization and curing studies” and department visit invitation (8-13 April 2000)
- **Germany (1999)**, International Conference on Bioplastics, invited lecture on “Overview of Bioplastics”, adjudged to be amongst top 3 speakers (23-25 June, 1999)
- **Sweden (1998)**, conference on biodegradable / environment friendly polymers, poster paper “Applications development studies of oxidised polysaccharides : biodegradability studies” (8-13 June 1998)
- **Turkey (1998)**, invited lecture on “Biodegradable Polymer Materials in India : Strategy for the Future” at UNIDO Conference (12-19 September, 1998)
- **U.K. (1995)**, special invitation from the BioComposites Centre, UK, for research discussions & for invited lecture on “Structural studies, reactions, & applications of renewable resource polymers” (20-27 March 1995)

Basic Research, Applied Projects / Industrial Consultancy Reports

1. Advisory Consultancy project with Hindustan Gum & Chemicals for advise on new products lines and research protocols (01 Dec 2016-30 Nov. 2017)
2. Advisory Consultant to CSIR-NCL on Reliance Industries project on synthetic elastomers (01 September 2015 – 31 March 2017)
3. Appointed as Nodal Officer for entire CSIR 12 Five Year Plan Biomass Program (6 CSIR laboratories) (2012-2017)
4. Biofuel Program (multi-institutional, NMITLI) : CSIR-Industry project on Waste agricultural residues (natural products) to biofuel (ethanol) (2007-2012)
5. CSIR-Industry project on Waste agricultural residues to value-added polymer products (two projects) (2002-2007) (successful from from lab scale to pilot plant installation, commissioning, and demonstration at industrial site) – (AWARD WINNING TECHNOLOGY) (2002-2007)
6. Technology Report to Godawari Sugar Mills on Separation of Cellulose, Hemicellulose and Lignin from Sugarcane Bagasse (2008)
7. Standard Operating Procedures for analysis of Cellulose, Hemicellulose and Lignin, submitted to Godawari Sugar Mills (Mumbai)

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8. Consultant to Dhampur Sugar Mills on Value-addition to Agricultural Biomass (New Delhi) (2008)
9. Nitrex Chemicals, Gurgaon, (Consultancy Report on Methyl cellulose) (2004)
10. Pidilite Industries, Mumbai, (Consultancy report on Hydroxyethylcellulose) (2005)
11. General Electric, USA, (Project and report on Heat stable cellulose) (1996-1998)
12. General Electric, USA, (Building blocks for polycarbonates from naturally occurring materials : Cashew Nut Shell Liquid based polymerizable monomers, US Patent received) (1998-2001)
13. DST project on Hydrophilic-hydrophobic balance of polymers (1988-91)
14. DST project on inositol based polyfunctional crown ethers (1995-1998)
15. DST project on structural and functional mimicry of biosystems : carbohydrate laced synthetic polymers as microbial nutrient (2003-2005)
16. Unilever, UK, (Castor oil based polyurethanes and monomers) (1992-1995)
17. Rallis India, Mumbai, (Project and Consultancy Report on Grape guard for shelf life improvement of grapes) (1989-1991)
18. Pudumjee Pulp and Paper Mills, Pune, (Consultancy report on Bagasse lignin characterization) (1991-1992)
19. Shriram Rayons, Kota, (Technology for chlorosulfonated polyethylene) (two projects) (1985-1990)
20. TVSSM (Farmers Cooperative Society)) (Consultancy, Grape guard usage) (1983-1984)

Highlights of Research Achievements :

- 1 Successfully set up a semi-commercial industrial pilot plant to demonstrate and validate the cutting-edge laboratory developed science & technology **to chemically fractionate waste agricultural biomass** residues like sugarcane bagasse, into highly pure cellulose (cotton-like purity), xylan (which is converted to xylose and then xylitol as a safe sugar for preventing dental caries and diabetes), and lignin (which is converted to lignosulfonates of use as super-plasticizer in cement). This technology seeks to position developing countries with high agricultural economies **as global innovation and technology leaders in this important field of green chemistry**, wherein not only are annually available biomass is value-added, but it is also a replacement for the scarce petroleum, and **serves to save energy and green house gas effects. Value-addition to farmers, and meets a societal need. Commercial plant of 50,000 TPA under construction.**

(Awarded NCL Scientist-of-the-year Award, 2011; VASVIK Award 2011 award given by Shri Narendra Modi; Director’s Commendation Award, NCL, Jan. 2008)

- 2 My work on **developing a new strategy to develop biodegradable environment friendly polymers** has attracted world attention. The work was lauded by an article appearing in the world’s best known journal “**Nature**” (Science Updates, December 11, 2002, web edition, entitled “Sugar turns Plastic Biodegradable – Bacteria make a meal of sweetened polythene and polystyrene”). It was also described by “**Appropriate Technology**” (2003), a UK based journal, taking note of appropriate technologies in the third world. Newspapers across the world brought out articles describing this work, and science editors of “Wall Street Journal” and “BBC” also called to discuss the work. **UK based “Plastics in Packaging”** (2003) did a world survey on “**Mother Nature’s Writing**” to describe natural renewable resources as materials for the future, and they focused on few important groups working in the field, and started with our work.

- 3 **Developed a break-through technology for preparing engineered shape and size nanoparticles of functionalized cellulose for use as anti-microbial and anti-TB material.**
This work has been patented and published. **The papers are amongst top rated papers with over 1200 downloads in one year 2014.**

- 4 **Transferred Hypalon Technology to M/s Shriram Rayons, Kota, Rajasthan**
(Won MRF Award, 1988 for this development)

- 5 Developed technology for improving shelf-life of grapes for grape farmers (Maharashtra State Grape Growers Association / Tasgaon Sheti Seva & Drakshkul Pvt. Ltd.)

Other Research and Development Contributions : Brief Description

1. **Developed chemistry of renewable organic raw materials such as cellulose, xylans, lignins, chitosans, and related polysaccharides by establishing an internationally recognized school of research with publications in top-most journals.**

2. **Green technology and chemistry** : Work with nature derived materials (used plant biomass, vegetable oils) as replacement for petroleum derived materials;

environment friendly processes based on minimizing organic solvents

- **use of ionic liquids instead of halogenated hydrocarbons**
- **use of natural materials** (natural polymers and natural monomers)
- **use of biotechnology** (enzyme and microorganism mediated synthesis) for effecting transformations to produce high value chemicals like lactic acid, xylose, chitooligosaccharides, etc.

3. **Developed nanotechnology of functionalized cellulose.** In particular, succeeded in engineering the shape and size of carboxycelluloses which have many biomedical applications. This is a breakthrough research, and has been lauded world-wide, as tailoring the shape of nanoparticles of polymers and metals is cutting edge research.
4. Developed nanolignins from sugarcane bagasse with the lowest particle sizes reported. These have industrial potential. The work is now under patenting.
5. **Biodegradable and Environmentally Friendly Polymers:** Developed new methodology for preparation of biodegradable environmental friendly polymers by using sugars linked to un-degradable polymers Composites of Natural Polymers.
6. **Polymers in Sustainable Development using Environment Friendly Natural Polymers and Non-Edible Vegetable Oils :**
 - **Value addition from waste agricultural residue biomass materials** (like sugarcane bagasse, wheat straw, rice straw, jute, etc.) **to promote Carbohydrate Economy** by deriving from them industrial polymers like Pure Cellulose, Hemicellulose (Xylan) and Lignins, and industrial platform chemicals like lactic acid and xylose (2002- continuing). Further, work on conversion of waste bagasse derived cellulose to biodegradable plastics like cellulose acetate for use as agriculture mulch film, carboxymethyl cellulose as biodegradable water soluble polymer, and methyl cellulose as food additive, lignin to lignosulfonates as super-plasticizer in cement, and xylose to xylitol is continuing.
 - Sugar-linked polystyrenes and polyolefins as **biodegradable polymers** (2001- continuing). Great potential as a new and innovative solution to environmental degradable polymers.

- Development of industrial products like heavy metal complexing agents and chitooligosaccharides as anti-microbial agents, **from ocean derived natural polymers** like Chitin (2003 – continuing)
- Non-edible vegetable oils like cashew nut shell liquid converted to high value polymerizable monomers like hydroxyoctyl phenol and carboxyoctyl phenol (1999 – 2001)
- Heat resistant cellulose fibres for use in polymer composites as replacement for glass fibres (1997- 1998)
- Non-edible vegetable oils like Castor oil for production of chemicals, polymers, and polymer composites, especially polyurethanes and new diol monomers based on castor oil derived hydroxystearates (1993 – 1995)
- Agriculture derived polymers like Starch and Cellulose as reaction-incorporated biodegradable fillers in plastics (1984 – 1995)

Courses taught at Post-graduate Level

1. Sustainable and Green Chemistry
2. Environment Friendly Processes for Sustainable Development
3. Organic Chemistry of Polymers
4. General Polymer Chemistry

Administrative Duties:

1. Member of Executive Council of Central University of Haryana
2. Member of Academic Council of Central University of Haryana
3. Member of Building Committee of Central University of Haryana
4. Chair of Non-discriminatory Committee Central University of Haryana
5. Chair of Grievance Committee Central University of Haryana
6. Chair of Standing Admission Committee of Central University of Haryana
7. Chair of Standing Academic Committee of Central University of Haryana
8. Convenor of Industry Interface Cell of Central University of Haryana
9. Chief Vigilance Officer, of Central University of Haryana

List of published papers in peer-reviewed journals

1. Biocatalytic synthesis of novel partial esters of a bioactive dihydroxy 4-methylcoumarin by *Rhizopus Oryzae* Lipase. Vinod Kumar, Divya Mathur, Smriti Srivastava, Sashwat Malhotra, Neha Rana, Suraj K. Singh, Brajendra K. Singh, Ashok K. Prasad, A. J. Varma, Christophe Len, R. C. Kuhad, R. K. Saxena, and Virinder S. Parmar, *Molecules*, 21, 1499 (2016); DOI 10:3390/molecules21111499
2. Pretreatment and Enzymatic Process Modification Strategies to Improve Efficiency of Sugar Production from Sugarcane Bagasse, Siddhartha Pal, Shereena Joy, Pramod Kumbhar, Trimuke, AJ Varma, Sasisanker Padmanabhan. *3Biotech Journal*, **126**, 6(2),(2016) DOI: [10.1007/s13205-016-0446-2](https://doi.org/10.1007/s13205-016-0446-2)
3. Effect of mixed acid catalysis on pretreatment and enzymatic digestibility of sugarcane bagasse, Siddhartha Pal, Shereena Joy, Pramod Kumbhar, Trimuke, AJ Varma, Sasisanker Padmanabhan. *Energy and Fuels*, 7310–7318, 30 (9), (2016) doi:[10.1021/acs.energyfuels.6b01011](https://doi.org/10.1021/acs.energyfuels.6b01011)
4. Pilot-scale pretreatments of sugarcane bagasse with steam explosion and mineral acid, organic acid, and mixed acids: synergies, enzymatic hydrolysis efficiencies, and structure-morphology correlations, S. Pal, S. Joy, P Kumbhar, Trimukhe KD, R. Gupta, RC Kuhad, AJ Varma, S. Padmanabhan, *Bioconversion and Biorefinery*, **2016**, DOI: 10.1007/s13399-016-0220-z
5. An Overview of Studies on Pilot Scale: Lignocellulosic Biomass Pretreatment Process Used in the Production of Second Generation Bioethanol, Siddhartha Pal, Sasisanker Padmanabhan, Shereena Joy, Pramod Kumbhar, Trimuke, AJ Varma. *Trends in Carbohydrate Chemistry*, **2015** Vol 7(4):41-59
6. Supramolecular transitions in native cellulose I during progressive oxidation reaction leading to quasi-spherical nanoparticles of 6-carboxycellulose P.R.Sharma and A.J.Varma, *Carbohydrate Polymers* **113**, 615–623, (2014)
7. A whole new world : agri based polymers present great possibilities, A.J.Varma, *Economic Times Polymers*, Aug. – Sept. Issue, (2014)
8. Thermal stability of cellulose and their nanoparticles : Effect of incremental increases in carboxyl and aldehyde groups P.R.Sharma and A.J.Varma, *Carbohydrate Polymers* **114**, 339-343 (2014)
9. Functionalized celluloses and their nanoparticles: morphology, thermal properties, and solubility studies P.R.Sharma and A.J.Varma, *Carbohydrate Polymers*, **104**, 135-142 (2014)
10. Functional nanoparticles from cellulose: engineering the shape and size of 6-carboxycellulose P.R.Sharma and A.J.Varma, *Chem. Commun.* **49**, 8818-8820, (2013)
11. Some aspects of cellulose hydrolysis P.R.Sharma, K.D.Trimukhe, and A.J.Varma *Trends in Carbohydrate Research*, **5(2)**, 7-11 (2013)

CV – Dr.A.J.Varma

12. Biodegradation of Styrene-Butadiene-Styrene Copolymer via sugars attached to the polymer chain, Rakesh Singh, Ramesh Chander Kuhad, Rishi Gupta, M. G. Adsul, D. V. Gokhale, A. J. Varma, *Advances in Materials Physics and Chemistry*, 3, 112-118 (2013)
13. Towards biodegradable elastomers : green synthesis of carbohydrate functionalized styrene-butadiene-styrene copolymer by click chemistry
R.Singh and A.J.Varma
Green Chemistry, 14, 348-356 (2012).
14. Enhanced enzymatic hydrolysis of cellulose by partial modification of its chemical structure
H. M. Shaikh, M. G. Adsul, D. V. Gokhale and **A. J. Varma**, *Carbohydrate Polymers* (86(2), 962-968 (2011)
15. Microbial production of xylitol from D-xylose and sugarcane bagasse hemicellulose using newly isolated thermotolerant yeast *Debaryomyces hansenii*, Gyan Prakash, **A J Varma**, Asmita Prabhune, Yogesh Shouche and Mala Rao, *Bioresource Technology* 102(3):3304-8 (2011)
16. Organic solvent facilitates acid hydrolysis of pretreated sugarcane bagasse polysaccharides for production of ethanol
Anil H. Valekar¹, Chandrashekhar M. Malba, Mukund G. Adsul, Digambar V. Gokhale, and **Anjani J. Varma** *Trends in Carbohydrate Research*, 2(3), 10-14 (2010)
17. Production of single cell protein, essential amino acids and xylanase by *penicillium janthinellum*, Mala Rao,^a A. J. Varma^b and Sumedha S. Deshmukh ^{a,*}*BioResources* 5(4), 2470-2477 (2010)
18. D(-)Lactic acid production from cellobiose and cellulose by *Lactobacillus lactis* mutant RM2-24 M.S.Singhvi, M. G. Adsul, **A. J. Varma**, and D. V. Gokhale
Green Chemistry, 12, 1106-1109 (2010)
19. Cellulases from *penicillium janthinellum* mutants: solid-state production and their stability in ionic liquids
M. G. Adsul, A. P. Terwadkar, **A. J. Varma**, and D. V. Gokhale
Bioresources, 4(4),1669-1680 (2009)
20. Hydrolysis of cellulose derived from steam exploded bagasse by *Penicillium* cellulases: Comparison with commercial cellulose
Rajkumar Singh, **A.J.Varma**, R. Seeta Laxman and Mala Rao
Bioresource Technology, 100(24), 6679-6681 (2009)
21. Pretreatment of plant biomass carbohydrates for ethanol production: An overview
A.J.Varma,
Trends in Carbohydrate Research, 1(2), 10-15, (2009)
22. Metal complexes of crosslinked chitosans : correlations between metal ion complexation values and thermal properties, K.D.Trimukhe and A.J.Varma, *Carbohydrate Polymers*, 75(1), 63-70 (2009)
23. Utilization of sugarcane bagasse cellulose for producing cellulose acetates: Novel use of residual hemicellulose as plasticizer, H.M.Shaikh, K.V.Pandare, G.Nair, and A.J.Varma, *Carbohydrate Polymers*, 76, 23-29 (2009)

CV – Dr.A.J.Varma

24. Environment friendly crosslinked chitosan as a matrix for selective adsorption and purification of lipase of *Aspergillus niger* K.D.Trimukhe, N.Mahadik, D.V.Gokhale , **A. J.Varma** International Journal of Biological Macromolecules, 43, 422-425, (2008)
25. A morphological study of heavy metal complexes of chitosan and crosslinked chitosans by SEM and WAXRD, K.D.Trimukhe and **A.J.Varma**, Carbohydrate Polymers 71, 698-702 (2008)
26. Complexation of heavy metals by crosslinked chitin and its deacetylated derivatives K.D.Trimukhe and **A.J.Varma**, Carbohydrate Polym., 71, 66-73 (2008)
27. Metal complexes of crosslinked chitosans : Part II - An investigation of their hydrolysis to chitooligosaccharides using chitosanase, K.D.Trimukhe, S.Bachate, D.V.Gokhale, **A.J.Varma**, International J. of Biological Macromolecules 41, 491-496 (2007)
28. Sugar-linked biodegradable polymers : regio-specific ester bonds of glucose hydroxyls in their reaction with maleic anhydride functionalized polystyrene and elucidation of the polymer structures formed, P.Galgali, M.Agashe, **A.J.Varma**, Carbohydrate Polym., 67(4), 576-585, 2007
29. Lactic acid production from waste sugarcanebagasse derived cellulose M.G.Adsul, **A.J.Varma**, D.V.Gokhale, Green Chemistry 9: 58-62, 2007
30. Strain improvement of *Penicillium janthinellum* NCIM 1171for cellulase production , Mukund G. Adsul, Kulbhushan B. Bastawde, **Anjani J.Varma**, Digambar V. Gokhale, Bioresource Technology 98: 1467-1473 (2007)
31. Carbohydrates – the future reservoirs of chemicals **A.J.Varma**, Chemical Industry Digest, Blockdale, Mumbai, pp.42-46, June 2006
32. Enzymatic hydrolysis of delignified bagasse polysaccharides M.G.Adsul, J.E.Ghule, R.Singh, H.Shaikh, K.B.Bastawde, D.V.Gokhale, **A.J.Varma** , Carbohydr. Polym. 62(1), 6-10 (2005)
33. Lignin-carbohydrate complexes from sugarcanebagasse : preparation, purification, and characterization R. Singh, S. Singh, K. D. Trimukhe, K. V. Pandare,K. B. Bastawade, D. V. Gokhale, **A. J. Varma**, Carbohydr. Polym. 62(1), 57-66 (2005)
34. Metal Complexation by Chitosan and its Derivatives : A Review **A.J.Varma**, S.V.Deshpande and J.F.Kennedy, Carbohydr. Polym. 55(1), 77-93 (2004)
35. Synthetic Polymers Functionalized by Carbohydrates: A Review, **A.J.Varma**, P.Galgali, and J.F.Kennedy, Carbohydr. Polym. 56(4), 429-446, (2004)
36. Fungal degradation of carbohydrate-linked polystyrenes, P. Galgali, U.S. Puntambekar, D. V. Gokhale, and **A. J. Varma**, Carbohydr. Polym., 55(4), 393-399 (2004)
37. Polysaccharides from Bagasse : Applications in Cellulase and Xylanase Production M. G. Adsul, J.E. Ghule, R. Singh, H. Shaikh,K.B. Bastawde, D.V. Gokhale, **A.J. Varma**, Carbohydr. Polym. 57(1),67-72, (2004)
38. Developing Biodegradable Polymers for Future Generations, **A.J.Varma**, Chemical Industry Digest, Blockdale Publishers, Mumbai, July-August Issue, 67-73 (2003)

CV – Dr.A.J.Varma

39. Towards biodegradable polyolefins : strategy of anchoring minute quantities of monosaccharides and disaccharides onto functionalized polystyrene, and their effect on facilitating polymer biodegradation
P. Galgali, **A.J.Varma**, U.S.Puntambekar, and D.V.Gokhale, JCS ChemComm, 23, 2884-2885 (2002)
40. Cyclitol based Neutral Complexing Agents. Effect of the Relative Orientation of oxygen atoms in the Ionophoric ring on the Cation binding ability of Myo-inositol based Crown ethers. K. M. Sureshan, M. S. Shashidhar and **A. J.Varma**, J. Org. Chem., 67,6884-6888 (2002)
- 41 Morphology of cellulose and oxidised cellulose in powder form
V B Chavan, B D Sarwade, and **A. J. Varma**
Carbohydrate Polymers, 50(1), 41-45 (2002)
- 42 Oxidation of cellulose under controlled conditions
A.J.Varma and M P Kulkarni
Polymer Degradation & Stability 77(1), 25-27 (2002)
- 43 Calcium complexation by low molecular weight dicarboxycellulose in aqueous solution
A.J.Varma and V.B.Chavan
Carbohydrate Polymers, 45,101(2001)
- 44 Neutral complexing agents with acyclitol core. Effect of the relative orientation of the sidearms and endgroups on the cation binding ability of myo-inositol based podands
K M Sureshan, M SShashidhar, and **A. J.Varma**
JCS Perkin Transactions 2, 12,2298-2302 (2001)
- 45 Effect of single-step chlorosulfonation of HDPE on its thermal properties in a sealed pressure reactor
A. J. Varma, PKondapalli, S V Deshpande and S P Kokane
Polym. Degrad. & Stab., 63(1), 5-9 (1999)
- 46 A comparative study of the thermal behavior of PVC, a series of synthesized chlorinated polyethylenes and HDPE
A. J. Varma, SV Deshpande and P Kondapalli
Polym. Degrad. & Stab., 63(1), 1-3 (1999)
- 47 Thermal behaviour of galactomannan guar gum and its periodate oxidation products
A J Varma, SP Kokane, G Pathak and S D Pradhan
Carbohydrate Polym., 32(7), 111-114 (1997)
- 48 Some observations on the high resolution solid-state CP-MAS ¹³C-NMR spectra of periodate-oxidised cellulose
A J Varma, V B Chavan, P R Rajmohan and S Ganapathy
Polym. Degrad. & Stab., 58 (3), 257-260 (1997)
- 49 A study of crystallinity changes in oxidised celluloses
A J Varma and V B Chavan
Polym. Degrad. & Stab., 49(2), 245-250 (1995)
- 50 Some preliminary studies on polyelectrolyte and rheological properties of sodium 2,3-dicarboxycellulose
A J Varma and V B Chavan
Carbohydrate Polym., 27(1), 63-68 (1995)

CV – Dr.A.J.Varma

- 51 Thermal properties of oxidised cellulose
A J Varma and V B Chavan
Cellulose, 2, 41-49 (1995)
- 52 Separations based on chemically selective polymer gels
A J Varma , A K Lele and R A Mashelkar
Chem. Eng. Sci.,50(23), 3835-3838 (1995)
- 53 Cellulosic diamines as reaction-incorporated filler in epoxy composites
A J Varma and V B Chavan
Cellulose, 1, 215-219 (1994)
- 54 Polyelectrolytes as stabilizers for emulsions of chlorosulfonated polyethylene in carbontetrachloride /water systems
A J Varma and S A Vaidya
J. Surf. Sci. & Technol., 7(2), 177-184(1991)
- 55 Evaluation of gas phase mass transfer at low Reynolds number –a new model system
V S Patwardhan, **A J Varma**, Y K Jamdade and R A Mashelkar,
Chem. Eng. Commun.,50, 155-163 (1987)
- 56 ESCA features of lignins
A J Varma
Polym. Test., 6,79-80 (1986)
- 57 Hydrolysis of a charged ester catalyzed by copolymers of 4- vinyl benzo-18-crown-6 and 4-vinylpyridine
A J Varma
Eur. Polym. J. ,22, 111-113 (1986)
- 58 On the dual role of starch, cellulose and their dialdehydes as fillers and accelerators in tertiary amine catalyzed curing of epoxy resins
A J Varma, and Y K Jamdade
Carbohydr. Polym., 5, 309-316 (1985)
- 59 Wide-angle x-ray diffraction study of the effect of periodate oxidation and thermal treatment on the structure of cellulose powder
A J Varma, Y K Jamdade and V M Nadkarni
Polym. Degrad. & Stab., 13, 91-98 (1985)
- 60 Morphology and mechanical properties of silicate filled polyurethane elastomers based on castor oil and polymeric MDI
A J Varma, M D Deshpande and V M Nadkarni
Angew. Makromol. Chem., 132, 203-209 (1985)
- 61 Angular-dependent XPS study of the treatment of silicate fillers with tridecylamine
A J Varma, A B Mandale and S Badrinarayan
Mat. Chem. and Phys., 10, 585-589 (1984)
- 62 X-ray photoelectron spectroscopic study of wood lignins
A J Varma,
Carbohydr. Polym., 4, 335-338 (1984)
- 63 Photoelectron spectroscopic studies of cellulose, starch and their oxidation products in powdered form
A J Varma

CV – Dr.A.J.Varma

- Carbohydr. Polym., 4, 473-480 (1984)
- 64 Curing characteristics of epoxy resins filled with cellulose and oxidised cellulose
A J Varma, Y K Jamdade and V M Nadkarni
Angew. Makromol.Chem., 122, 211-218 (1984)
- 65 Electrical surface conductivity of fluorinated polymer films after chemical surface treatment
A J Varma, J P Jog and V M Nadkarni
Makromol. Chem. Rapid Commun., 4, 715-719 (1983)
- 66 Synthesis of substituted 2,6-dioxabicyclo [3.1.1] heptanes 1,3-anhydro-2,4,6-tri-O-benzyl and 1,3-anhydro-2,4,6-tri-O-p-bromobenzyl -B-D-mannopyranose
A J Varma and C Schuerch
J. Org. Chem., 46, 799-803 (1981)
- 67 Decarboxylation of 6-nitrobenzisoxazole-3-carboxylate in benzene catalyzed by crown ethers and their polymers
J Smid, **A J Varma**, and S C Shah
J. Amer. Chem. Soc. 101, 5764-5469 (1979)
- 68 Polysalt complexes of poly (vinylbenzo-18-crown-6) and of poly (crown acrylates) with polyanions
A J Varma, T Majewicz and J Smid
J. Polym. Sci., Polym. Chem. Ed., 17, 1573-1581 (1979)
- 69 Some aspects of ion binding to polymers
J Smid, L Wong, **A J Varma** and S Shah
Polym. Preprints, 20(1), 1063-1066 (1979)
- 70 Macrocyclic ligands on polymers
J Smid, S Shah, R Sinta, **A J Varma** and L Wong
Pure & Appl. Chem., 51, 111-122 (1979)
- 71 Solute binding and catalysis by poly (vinyl benzo-18-crown-6)
J Smid, S Shah, **A J Varma** and L Wong
J. polym. sci., C Polym. symp., 64: 267-280 (1978)
- 72 Polysalt complexes of poly (crown ethers) and sodium carboxymethylcellulose
A J Varma and J Smid
J. Polym. Sci., Polym. Chem. Ed., 15, 1189-1197 (1977)

Books and Book Chapters :

1. Environmentally Degradable Polymers – Proceedings of ICS-UNIDO Workshop, Pune, India
Editors, S.Sivaram, **A.J.Varma**, and S.Miertus, Nov. 10-15, (1997)
2. Prospects for biodegradable plastics based on utilization of renewable resource polymers, by **A.J.Varma**,
Chapter 6.2 in “Plastic Waste Management and Environment”, International Conference Proceedings, Ed.V.P.Malhotra, Shriram Inst. Of Industrial Research, New Delhi, March 15 - 16, (2001)

3. Biodegradable Polymers from Sugars

A.J.Varma,

Chapter 7 in “Industrial Applications of Biodegradable Polymers”, Ray Smith, Ed., CRC & Woodhead Publishers, UK (2005)

List of Patents submitted by Dr A J Varma

- 1 Varma, A.J., Sharma, P.R. and Sarkar, D. (2014) Synthesis of nanostructured carboxycellulose from non-wood cellulose. *WO 2014195971 A4* (22 Jan. 2015)
- 2 Process for fractionating sugarcane bagasse into high alpha-cellulose pulp, xylan and lignin, A. J. Varma, US Pat. 8529731 dated 10 Sept. 2013.
- 3 A process for fractionating sugarcane bagasse into high alpha-cellulose pulp, xylan and lignin, A. J. Varma, China Pat. ZL 200880111416.3 dated 09 Jan. 2013.
- 4 Synthesis of nanostructured carboxycelluloses from non-wood cellulose, 0095NF2013, dated 30 May 2014
- 5 Hydroxyalkyl]phenols, Methods of preparation, and uses thereof A.J.Varma and S.Sivararam, U.S. Patent No. 6,451,957 dated September 17, 2002
- 6 Biodegradability of synthetic polymers through introduction of carbohydrate molecules
A.J.Varma, P.Galgali, U.S. Puntambekar, D.V. Gokhale,
(Patent Application No. NF-593/2002 dated Dec. 2002)
- 6 An improved process for the preparation of starch based polyesters
A J Varma, S P Kokane, P Deshpande, A Paradkar, and N Choudhary
Indian Patent 216245, 11 March 2008.
- 7 An improved process for chlorosulfonation of olefinic polymers
K S Balaraman, S Gopichand, S Gundiah, RA Mashelkar, S H Vaidya, G R Veniktakrishnan and A J Varma
Indian Patent 171904 (1994)
- 8 Preparation of Copolycarbonates from 3-(8-Hydroxyoctyl)phenol
C.V.Avadhani, A.J.Varma, S.Sivaram, M.Nelson, M.A.Duncan
US Patent Disclosure Letter Docket No. 8CL 7360 (Jan.26, 2000)
- 9 Preparation of copolycarbonates from 3-(8-carboxyoctyl)phenol
C.V.Avadhani, A.J.Varma, S.Sivaram, and M.Nelson
US Patent Disclosure Letter (January 26, 2000)

CV – Dr.A.J.Varma

10 An improved process for the synthesis of 3-(8-Carboxyoctyl)phenol A.J.Varma and S.Sivaram

US Patent Disclosure Letter (July 2000)

11 A process for fractionating sugarcane bagasse into high alpha-cellulose pulp, xylan and lignin Inventors: Anjanikumar Jyotiprasad Varma
IN 1893DEL2007 dated 09/06/2008 (Prov. Dated: 07/09/2007)

12 A process for fractionating sugarcane bagasse into high alpha-cellulose pulp, xylan and lignin, Anjanikumar Jyotiprasad Varma
PCT/IN2008/000569 PCT filed date 05/09/2008

List of conference papers / lectures

1. Processing of Biomass to Obtain all its Major Constituents and as Value-added Products, Bioprocessing India Conference (BPI-2016), Invited lecture, IISER Mohali, 15-17 Dec. 2016.
2. **Lignocellulose Biomass Valorization, ACS Pacifichem 2015 Conference, Chair and Presiding Officer, and Invited talk, Honolulu, Hawaii, USA (16-17 Dec. 2015)**
3. **New developments in functionalized nanocelluloses**
Indo-German Conference, Delhi University, 30 March 2015
4. **New developments in functionalized nanocelluloses**
Indo-German Conference, Delhi University, 30 March 2015
5. **New developments in functionalized nanocelluloses**
Delhi University, 26 Feb 2015
6. **Recent advances in lignocellulose, cellulose, and nanocellulose : chemistry and applications**
ACCTI, Dehra Dun Jan. 20-22, 2014
7. **Bionanoresources : Preparation, properties and applications of a new set of nanocelluloses and nanolignins from sugarcane bagasse**
A.J.Varma and PR Sharma
BRSI-JNU, New Delhi, 3-6 Nov. 2014
8. **New developments in lignocelluloses, cellulose, and Nanocellulose: Biofuels to Bioproducts using Advanced Nanotechnology**
AJ Varma, ICT Mumbai National Conference, 18 Dec. 2014
9. **A Carbohydrate Economy : Polymers, Chemicals and Fuels from Agricultural Biomass**
ACCTI, HP University, Shimla, 11-12 Nov. 2010
10. **State of the Art Bio-Ethanol Technology in India**
TERI-Toyota Conference on Biofuels, 7 June 2013
11. **Modified Natural Polymers and Their Applications**
Copenhagen, March 27, 2000
12. **Starch and Cellulose Based Products :Emerging Trends in Chemical Technology**
2nd. National Seminar on Root and Tuber Crops
Thiruvananthapuram, July 19-20, 2005

- 13. Agricultural residue derived polysaccharides as organic raw material for production of chemicals, polymers**
ISCBC Conference, Delhi University, Feb. 27- March 1, 2009
- 14. Use of Agricultural and Wood Waste for Production of Chemicals and Polymers**
ICS-UNIDO Conference, Cairo, Egypt, 29-30 March, 2008
- 15. Future Prospects For The Sugarcane Industry**
Conference of Maharashtra Rajya Sahakari Sakhar Karkhana Sangh Ltd., Goa, 27-28 Feb. 2009
- 16. Biomass as a Source for Chemicals and Polymers Industrial Polymers Cellulose, Lignin, & Hemicellulose from Sugarcane Bagasse**
ICMA, Mumbai, 16 March, 2007
- 17. Environment Friendly Materials using Monosaccharides, Disaccharides and Polysaccharides**
Indo-French Conference, Pune, 11 Feb 2003
- 18. Valorization of bio-based polymeric materials and related conversion technologies**
ICS-UNIDO Workshop, Trieste, Italy, 18 September, 2008
- 19. Valorization of bio-polymers for production of plastics, materials, and added value chemicals**
ICS-UNIDO Workshop, Trieste, Italy, 21 April 2009
- 20. Biorefinery in India: a case study**
ICS-UNIDO, Trieste, Italy, 16-17 Nov. 2009
- 21. MNRE Workshop on Second Generation Biofuels Current Status of Biorefinery R & D in India**
MNRE, New Delhi, 12 Oct. 2009
- 22. Environment-friendly Natural Polymer Composites**
Chemical Building Blocks from cellulose, 29 March 2000 Syracuse
- 23. Sustainable Plastics and Evaluation of Forefront Technologies on EDP's**
ICS-UNIDO Workshop, December 5-6, 2005, Trieste, Italy
- 24. "Sustainable Plastics in India and Asian Countries"**
ICS-UNIDO, Pune, 22 Nov 2006 (Organized conference by us)
- 25. EDP's and Bio-Based Materials for Sustainable Development in India**
ICS-UNIDO Beijing, China, 26-29 October, 2007
- 26. Advanced processes and cellulosic ethanol**
India-Brazil Bioenergy Workshop Aug. 1-2, 2011
Organized by The Department of Science & Technology, GOI; Indian Institute of Sugarcane Research, Lucknow; CSMCRI, Bhubaneswar and the Brazilian Academy of Sciences
- 24. Carbohydrate-linked Polystyrene : Biodegradability Studies**
A.J.Varma, P.Galgali,D.V.Gokhale, U.Puntambekar, & J.V.Khire
77th. World Conference on Biodegradable Polymers & Plastics, Pisa, Italy,June 4-8, 2002)
- 25. Heavy metal complexation by natural polymers**
A.J.Varma,S.V.Deshpande, K.D.Trimukhe
7th. World Conference on Biodegradable Polymers & Plastics, Pisa, Italy,June 4-8, (2002)

CV – Dr.A.J.Varma

26. Metal complexation by polysaccharides : strategy to improve selectivity by linking new ligands
S.V.Deshpande, K.D.Trimukhe, and **A.J.Varma**
Fourth National Symposium in Chemistry, Pune, India, Feb.1-3 (2002)
27. Studies on chemical modification of chitin/chitosan
S.V.Deshpande and **A.J.Varma**
Twente University-NCL Workshop on Polymer Science, held at NCL, Pune, India, Feb. 19, (2001)
28. Semi-synthetic biodegradable polymers
P.Galgali and **A.J.Varma**
Symposium on Polymer Science and Engineering, Society of Polymer Science & Engineering, Pune Chapter, Dec. 2001
29. Crosslinking and Functionalization of Chitin, a Natural Polysaccharide
K.D.Trimukhe and **A.J.Varma**
Symposium by Society of Polymer Science & Engineering, Pune Chapter, Dec.,2001
30. Cellulose powder as a component of thermosetresins: characterization, functionalization, and curing studies
A. J. Varma,
Conference on “Wood and Cellulose: Building Blocks for Chemicals, Fuels, and Advanced Materials”, SUNY-ESF, Syracuse, N.Y, April 9-11 (2000)
31. Overview of the technical developments in bioplastic materials
A.J.Varma
Proceedings of International Symposium on Bioplastic Materials, Bonn, Germany, June 23-24, (1999)
32. Methodology for applications of renewable resources as reaction-incorporated components of engineering polymers
A.J.Varma
Proceedings of International Symposium on Bonn, Germany June23-24, (1999)
33. **Synthesis and alkali metal binding studies with ether derivatives of myo-inositol**
K M Sureshan, **A. J. Varma**, M S Shashidhar and S V Deshpande
Proceedings of National Symp. in Chemistry, I I Sc Bangalore, Jan.27-30 (1999)
34. **Biodegradable polymer materials in India: Strategy for the future**
A. J. Varma
ICS-UNIDO Workshop on “Environmentally Degradable Polymers: Environmental and BiomedicalAspects”, Antalya, (Turkey), Sept. 12-19 (1998)
35. **Applications development studies of oxidised polysaccharides : biodegradability studies**
A J Varma, SP Kokane and I M Sutar
Proceedings of 5thInternational Scientific Workshop on “Biodegradable Plastics and Polymers”, Stockholm (Sweden), June 9-13, (1998)
36. **Inositol based neutral complexing agents**
A J Varma, MS Shashidhar, K R Shah, and S P Kokane
XII Carbohydrate Conf., Lucknow (India), Nov20-21, (1997)

37. **Studies on renewable resources as major components of polymeric materials**
A J Varma
Proceedings of UNIDO-ICS International Scientific Workshop on “Environmentally Degradable Polymers”, Pune (India), Nov. 10-15, (1997)
38. **Inversion recovery cross polarisation (IRCP) in oxidised forms of cellulose**
P R Rajmohan, **A J Varma**, V B Chavan and S Ganapathy
Proceedings of 3rd National Symposium on Magnetic Resonance, IIT (New Delhi), Feb 9-7 (1997)
39. **Investigations in periodate oxidation of chitin**
A J Varma and S P Kokane
Proceedings of XI Carbohydrate Conf., Jadavpur, Calcutta, Nov. 21-22, (1996)
40. **Characterization of sodium dicarboxylate galactomannan by thermal analysis**
A J Varma and S P Kokane
Proceedings of XI Carbohydrate Conf., Jadavpur, Calcutta, Nov. 21-22, (1996)
41. **Thermal behaviour of oxidised TKP**
A J Varma and S P Kokane
Proceedings of XI Carbohydrate Conf., Jadavpur, Calcutta, Nov. 21-22, (1996)
42. **Synthesis and thermal properties of polymers of polymers of myo-inositol derivatives**
K R Shah, S P Kokane, G Pathak, M S Shashidhar and **A J Varma**
Proceedings of XI Carbohydrate Conf., Jadavpur, Calcutta, Nov. 21-22, (1996)
43. **Oxidation products of guar gum : thermal behavior**
A J Varma and S P Kokane
Proceedings of XI Carbohydrate Conf., Jadavpur (Calcutta), Nov. 21-22, (1996)
44. **Polyelectrolyte behaviour of sodium 2,3-dicarboxycellulose- an industrially important nature-derived polymer**
V B Chavan and **A J Varma**
Proceedings of Indian Chemical Engineering Congress, Madras, Dec. 18-21 (1991)
45. **High resolution solid state C-13 NMR study of cellulose and its oxidised derivatives**
A J Varma, S B Chavan, P R Rajmohan and S Ganapathy
Proceedings of All India Conference on “New Dimensions in Science & Technology” at BHU, Varanasi, Feb 7 (1991)
46. **Polyelectrolytes as stabilizers for emulsions of chlorosulfonated polyethylene in Carbontetrachloride / water systems**
A J Varma, and S A Vaidya
Proceedings of 8th International Symposium on Surfactants in Solution, Florida, USA, June 10-15 (1990)
47. **Solvent separation by selective absorption in polymeric gels**
A J Varma
Proceedings of the Indian Chemical Engineering Congress, Trivandrum, Dec 15-18,

(1989)

- 48. Chlorosulfonation of polyethylene : Kinetics and microstructure**
K S Balaraman, and **A J Varma**
Proceedings of the 14th Rubber Conference, IRMRA, 17 Jan 1988
- 49. Solvent effects on the alkali metal naphthalenide treatment of fluoropolymers and the electrical conductivity**
A J Varma, J P Jog and V M Nadkarni
Proceedings of the second National Conference on Fluoride Chemicals and Polymers, Kanpur, March (1985)
- 50. Advanced polymer chemistry in aid of viticulture: application of polymer- polymer complex formation studies in the synthesis of grape guard paper**
A J Varma
Proceedings of the First National Workshop on Post Harvest Management Of Grapes, Feb. 4-6 (1985)
- 51. Chair of Indo-Canadian Joint Workshop on Accelerating Innovation : Strategies for collaboration and commercialization, held at Pune 10 Dec. 2009. Dr.A J Varma chaired the first panel discussion on “Innovation in Clean Technology”.**