



10th Asia-Pacific Drying Conference (ADC2019), Vadodara, India, December 14–17, 2019

S. S. Shirkole

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CONFERENCE REPORT



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Introduction

The 10th Asia-Pacific Drying Conference (ADC2019) was successfully organized by the National Institute of Technology Rourkela, Odisha, India during December 14–17, 2019 at Lakshmi Vilas Palace, Vadodara, Gujarat, India. The ADC series of biennial conferences was established in 1999 by Prof. A. Kamaruddin of Bogor University, Indonesia and Prof. Arun S. Mujumdar of McGill University, Canada. It is modeled after the widely acclaimed biennial International Drying Symposium Series (IDS), which was initiated in 1978. The conference venue has since moved to several locations, including Malaysia, Thailand, India, Hong Kong, and People's Republic of China. ADC2019 brought together over 163 participants from the Asia-Pacific region, Africa, Europe, and North America, representing academic institutions, industries, and government agencies.

Under the theme *Integrating Innovations with Cost-Effectiveness for Competing Drying Technology*, the event demonstrated the importance of innovations and cost reduction at the industrial level in order to realize the sustainable development goals (SDGs) in the field of drying. The participants presented their research work on drying of chemicals, food, pharmaceutical, and agricultural products. The level of industry participation and their interest in innovative drying technologies were observed to be very high. The unique feature of this conference was the diverse gathering of academicians and industry professionals with a core focus on improving the industry–academic collaborative research on drying. Indeed, the objectives of the conference were noted to be the following:

- To highlight the key issues related to existing approaches of traditional and innovative drying technologies for maximum benefits to drying equipment manufacturers, processing industries, drying researchers, and end-user.
- Possible improved solutions to ensure sustainable drying technologies.

- Ensuring fast growth in the development of the drying industry.
- To become a catalyst for change in drying industries and drying practitioners across globe.
- Providing a good platform for all drying professionals to exchange and disseminate ideas and recent findings and to share practical issues and best practices.

The conference was inaugurated in the presence of Prof. Arun S. Mujumdar, Founding Chair of the Asia-Pacific Drying Conference (ADC) Series and International Drying Symposium (IDS) Series, and Prof. Vijaya Raghavan of McGill University, Montreal, Canada as a guest of honor. Congratulations are due to the convener and program chair Dr Parag P. Sutar, co-conveners of the conference (Dr D. S. Nimaje, Dr P. Balasubramanian, Dr K. Gangawane, and Late Dr R. Jayabalan), the program coordinator (Mr Tanmay Shah, CEO, Morrikko Pure Foods), the organizing committee members from the sponsoring industries, and the students of NIT Rourkela responsible for the smooth and successful organization of this major event. Organizers are very much thankful to Prof. Hong Wei Xiao of China Agricultural University for his great support in organizing the conference. The target behind the theme of the conference was achieved through active participation of industries and academics in the special session on 'Industry-Academia Interaction.' Thus, the conference achieved the overall goal of network building, experience sharing, and industry–academia gap reduction.

Conference statistics

The conference received 152 abstracts from 17 countries (9 Asian countries and 8 non-Asian countries). There were 2 plenary sessions and 14 oral sessions with a total of 44 oral presentations and 16 keynote lectures. Additionally, 67 posters were presented in four sessions along with active participation from 17 companies as listeners. A total of 163 delegates



Figure 1. Participants of the 10th Asia-Pacific Drying Conference (ADC2019).

participated, out of which 124 were from academic and research organizations and 39 were from industries (Figure 1). High-quality papers scrutinized by the ADC2019 scientific committee will be published in special issues of *Drying Technology*, *Legume Science*, and *Journal of Food Science and Technology* after the peer-review process.

The papers were presented in the following broad areas indicating the current research trends in drying:

- Drying of food and agricultural products
- Drying of botanicals, coal drying
- Fecal sludge drying
- Solar drying
- Sterilization of dried products
- CFD modeling and simulation of the drying process
- Simulation of heat and mass transfer operations in drying
- Drying and encapsulation
- Drying for sustainable food security and safety
- Drying of pharmaceuticals and drug delivery system
- Digitization in the drying industry
- Drying in the dairy industry
- Microwave and infrared drying
- Spray drying

- Improving the quality of dried products
- Drying of effluents and other waste chemicals
- Energy analysis and conversion in drying processes
- Thermal storage and heat exchange in drying
- Low humidity drying

Plenary and keynote lectures

Prof. Arun S. Mujumdar and Prof. Vijaya Raghavan delivered the plenary lectures entitled “Innovation in Drying Technologies - Status, Needs and Opportunities” and “Capacity Building for Sustainable Food Security and Safety,” respectively. The delegates were motivated by the innovative and visionary ideas of the plenary speakers about drying technologies and sustainable food security. Another 14 outstanding keynote speakers from various countries added a great value to the technical program.

Sponsors

The conference received generous sponsorships from nine leading drying-related companies, which included drying equipment manufacturers (Twin Engineers Pvt. Ltd, Kerone Engineering Solutions Ltd, Litel Infrared



Figure 2. Arun S. Mujumdar Award presentation to Prof. Timothy Langrish.

Systems Pvt. Ltd, and Steelhacks Industries) and process industries (Solvay Research and Innovation Center, Morriko Pure Foods Pvt. Ltd, Burlyfield Biotech, and Jayveer Foods). The organizers are thankful to Mr J. T. Patel (Twin Engineers), Mr M. Gandhi (Kerone), Mr R. Devlalikar (Twin Engineers), Mr P. B. Kulkarni (Litel Infrared), Ms Bijal Mathkar (Solvay), Mr Anant Patel (Jay Veer Foods), and Dr Baburao from Visakhapatnam, Andhra Pradesh (India) for their personal contribution to the sponsorship program. The success of ADC2019 was indeed due to the significant tangible contributions of the sponsors.

Conference awards and certificates

Following the tradition of ADC conference series, this conference recognized several researchers and industry professionals for their contribution to drying research, development, and service. The prestigious Arun S. Mujumdar Medal, which was established by the research associates and friends of the *Drying Guru* in his name to recognize those who have made outstanding contributions to drying R&D, mentoring younger generation of researchers and promoting drying research on a global scale, was presented to Prof. Timothy G. Langrish of the University of Sydney, Australia (Figure 2). The lifetime achievement awards were presented to Prof. B. N. Throat

of Institute of Chemical Technology, Mumbai, India; Prof. U. S. Shivhare of Panjab University, Chandigarh, India; and Mr J. T. Patel of Twin Engineers, Vadodara, Gujarat, India for their outstanding contribution to drying and dehydration. Award certificates were also presented to the following researchers.

- Outstanding contribution to the promotion of drying technology via editorial processing of free e-books: Dr Sachin V. Jangam, National University of Singapore, Singapore.
- Outstanding effort in advancing drying R&D in Asia and excellent contribution to food drying technologies: Dr Hong-Wei Xiao, China Agricultural University, China.
- Outstanding innovative research in food drying science and technology: Dr Min Zhang, Jiangnan University, China.
- Outstanding contribution to drying science and technology: Dr Dong Chen, Soochow University, Suzhou, China.
- Outstanding contribution to the promotion of drying R&D in Asia: Dr Parag P. Sutar, National Institute of Technology Rourkela, India.

Additionally, the award committee of ADC2019 selected the best oral presentation and the best poster presentation. CRC Press presented the winners with a

copy of the 4th edition of the acclaimed *Handbook of Industrial Drying*. The winners are the following:

Best oral presentation:

- Shirkole S. S., for the paper entitled “Microwave and Infrared Assisted Drying Cum Sterilization of Food Products: Equipment and Process.”

Best poster:

- Lavanya M. N., for the poster entitled “Development and Characterization of Bromelain Dry Powder Using Spray Freeze Drying for Pulmonary Delivery.”

Press conference


The press conference was held on December 15, 2019, at the conference venue and it was jointly addressed by Prof. Arun S. Mujumdar and Dr Parag P. Sutar. The aim of the press conference was to give wide publicity of the need for research in drying technology and various activities across the globe under the leadership of Prof. Arun S. Mujumdar through the ADC and IDS conference series. Two television news channels in Gujarat, namely, Gujarat Television Pvt Ltd (GTPL) and Spark Today News, broadcasted the event news and interview of Prof. Mujumdar.

Social program

The organizers are grateful to Hariprasad Swamiji of Shree Akshar Purushottam Swaminarayan Temple, Sokhada, Vadodara and Dr Kamlesh Patel (Fonterra Australia Pty. Ltd.) for organizing a spiritual lecture for participants of ADC2019 and sponsoring the conference dinner during the temple visit at Haridham, Sokhada, Vadodara. The evening program helped the foreign participants to understand Indian spiritual culture.

ADC2021 proposal

The 11th Asia-Pacific Drying Conference (ADC2021) will be organized by Nong Lam University, Vietnam. Prof. Vinh Truong presented the proposal to host ADC2021 in Vietnam and the proposal was accepted by all participants. The theme for ADC2021 is “Innovative Drying Technologies for High-value End Products and Drying Efficiency.” More information will be available soon in *Drying Technology* homepage and on the personal webpage of Prof. Arun S. Mujumdar (www.arunmujumdar.com).

Dr. S. S. Shirkole 

National Institute of Technology Rourkela, Rourkela,
India

 shivanandshirkole@gmail.com