

## Those Who Seek Knowledge Shall Find It

For well over forty years now, Prof. Arun Mujumdar has been involved in chemical engineering research. His accomplishments in the field of drying require no introduction. However, Prof. Mujumdar is not only an expert academic but also a benevolent one, having made several of his most important publications available free of cost to the community. The e-books, available for download on his website, cover topics in the field of drying and beyond.

The most extensive collection of this online treasure is in the area of drying technology. The book 'Drying of Foods, Vegetable and Fruits' is a comprehensive guide for any person interested in the dehydration of food products.<sup>[1-3]</sup> The first volume of this treatise discusses the concept of drying, the properties of food materials that influence the drying process and also provides insights and commentary into the current state of global research and development in drying.<sup>[1]</sup> It also talks in detail about a traditional drying method – osmotic drying, and a modern one – foam mat drying. Budding entrepreneurs and industrialists can benefit from the chapter on selecting a dryer to suit an application. Academics can derive great pleasure from a dedicated chapter elucidating the role of statistical design in food dehydration. Sections on energy efficiency during and product evaluation post drying will interest the academia and the industry alike. The second volume of this literary work shifts focus to a product-specific view of drying.<sup>[2]</sup> It analyzes the drying requirements of high volume products like roots and rice products. Marine products including fish, which have been traditionally dried all over the world, have also been dealt with in a modern context. The volume especially does well to expand on the dehydration of high-value products, with dedicated sections devoted to exotic fruits, medicinal plants, functional foods and probiotics. The third and final volume again delivers a good mixture of conventional and novel drying processes.<sup>[3]</sup> Extrusion and fluidized bed drying have been discussed in great detail, and so has the process of bread baking, of which drying is an indispensable component. The book opens with a chapter on microwave vacuum freeze-drying, a novel technology to ensure rapid yet delicate drying of high-value fruits and vegetables. Delving deeper will take you to a segment on vacuum frying, an innovative process aimed at preserving the organoleptic and nutritional qualities of fried foods.

Works listed on the website are not limited to foods. The book 'Coal Dehydration: A Compilation of Relevant Publications and Technical Reports' is an excellent discourse on the state of the art and prospective opportunities in the drying of this important energy source.<sup>[4]</sup> In this work can be found a critique on the drying of low rank coal and an analysis of the patents related to it. A contextual tutorial can also be found for the use of Simprosys, a helpful instructional tool for simplifying calculations in chemical engineering operations. The publication signs off with insights on the potential for innovation in the drying of minerals.

There are also books dedicated to specific drying technologies like spray drying and solar drying. 'Spray Drying Technology' dissects the various aspects of the process – mathematical, physical and chemical.<sup>[5]</sup> Computational fluid dynamics of

the spray drying process have been discussed along with an exclusive section on the modeling of liquid atomization. A simplified one-dimensional procedure for designing a spray dryer has also been explained. Sections on manipulating the physical properties of powders to be spray-dried and in-process crystallization control will help any prospective user of this technology to arrive at a powder of desirable rheology. Chapters on spray freeze drying and the spray drying of food and herbal products provide a commentary on the unique requirements of these processes. The literary work on solar drying begins with an important disquisition about the principles on which solar drying is based and the decision making involved in the selection of a solar dryer.<sup>[6]</sup> With segments devoted to fruits and vegetables, major commodity products and fishery products, this book encompasses all the current applications of solar drying while also commenting on future possibilities. Given the growing interest in solar drying, this publication is attracting growing interest with time.

It is also worth mentioning that the website contains a forward-looking book that discusses specifically the opportunities for innovation in drying.<sup>[7]</sup> This exposition begins with a perspective on the challenges and needs facing the drying industry globally, before discussing opportunities in specific drying technologies such as spray drying and pulsed combustion drying. A picture has also been portrayed of the role of the International Drying Symposium (IDS) in promoting innovation in drying technologies globally.

Outside of drying, literature can also be found on fluidization engineering. The treatise 'Fluidization Engineering Practice' covers the diverse applications of the phenomenon of fluidization.<sup>[8]</sup> The first of these applications is the exploitation of multiphase flow modeling for nuclear applications. Another application important for the plastics industry - the employment of gas fluidized beds for carrying out the polymerization reaction has also been covered. Readers interested in surface coating technologies can draw upon the knowledge contained in the special chapter on coating and agglomeration. The use of vibrofluidized beds for crystallization has been covered and so has combustion in fluidized beds. The production of silicon with the aid of integrated fluidized bed reactors has also been detailed. An important segment deals with gas distribution in fluidized beds and a chapter has also been dedicated to measurement techniques in gas-solid fluidized beds.

Readers seeking a break from technical jargon can find solace in ASmart, a collection of fine water color art by Prof. Mujumdar.<sup>[9, 10]</sup> The fact that each of the paintings has been accompanied by a relevant inspirational quote makes ASmart not only a relaxing read but also a motivational one. In summary, Prof. Mujumdar has ensured that a person who desires to learn shall not go without doing so. Such a person will do well to visit <http://www.arunmujumdar.com/e-books.htm>.

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P.S. A detailed exposition on the same topic is scheduled to be published in *Drying Technology* later this year.

## References

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