ELSEVIER

Journal of Hazardous Materials B138 (2006) 205–208

Journal of Hazardous Materials

www.elsevier.com/locate/jhazmat

Book reviews

Waste Treatment in the Food Processing Industry, Lawrence K. Wang, Yung-Tse Hung, Howard H. Lo, Constantine Yapijakis (Eds.). CRC/Taylor & Francis Group, Boca Raton, FL (2006). 342 pp., US$ 89.95, ISBN: 08493072364

Food waste has long been one of my interests as I served as President of the League for International Food Education whose headquarters were in Washington, DC. As a result of that service, I was privileged to go on a US Agency for International Development-sponsored trip to an International Chemical Engineering Conference in Rio de Janeiro, Brazil where I presented and subsequently published in Chemical Engineering Progress a paper entitled "Resource Recovery from Food Waste".

While the book does not focus on resource recovery, I did find a short (three-page) discussion on the recycling of garbage. The products of this process were compost and biogas. There also was a vsingle table with data on recycling of waste from beer production.

In the preface, the editors state: "Important waste treatment topics covered in this book include: dairies, seafood processing plants, olive oil manufacturing factories, potato processing installations, soft drink production plants, bakeries and other food processing facilities. Special efforts were made to invite experts to contribute chapters in their own expertise". These authors have contributed separate chapters on the foregoing mentioned topics. All authors, save one, were from outside North America. Consequently, numerous references are to non-US publications which open up a new source of data on food wastes not usually encountered in North America, e.g., palm oil, olive oil, etc.

Each chapter appears to have its own strengths, but I was particularly impressed by discussions of "Olive Oil Waste Treatment" in chapter 5 and "Potato Wastewater Treatment" in chapter 6. Both chapters were well written, but what impressed most were the mathematically worked design examples as well as "Case Studies".

Chapter 2 addresses seafood wastes and contains no such worked design examples, but the authors do an excellent job discussing various pieces of wastewater treatment equipment such as inclined screens, clarifiers, inclined plate clarifiers, dissolved air flotation systems, activated sludge wastewater systems, trickling filters, rotating biological contactors, Imhoff tanks and electrocoagulation. Costs of wastewater treatment plant operations also are given.

The last chapter is on a general topic and is simply entitled "Food Waste Treatment". In this chapter, the authors discuss the treatment of a variety of wastes, which in the main, were from Japanese food production processes. New topics found in this chapter include composting, biogas production, incineration with energy recovery, and hazardous wastes from food processing (the US law, EPCRA, which is the Emergency Planning and Community Right-to-Know Act is briefly touched upon with regard to chemicals used in food processing). Waste management in the fermentation industries is very briefly discussed. The book ends with tables on "Sludge Recycling Centers Using Anaerobic Treatment in Japan" and "Energy Efficiency of Biogas Production System and Incineration with Power Generation". Both of these topics are forward-looking and merit more space.

Gary F. Bennett *
The University of Toledo, Department of Chemical and Environmental Engineering, Mail Stop 305, Toledo, OH 43606-3390, United States

* Tel.: +1 419 531 1322; fax: +1 419 530 8086.
E-mail address: gbennett@eng.utolebo.edu

1 May 2006

Available online 15 June 2006

doi: 10.1016/j.jhazmat.2006.05.109

Gasification Technologies: A Primer for Engineers and Scientists, J. Rezaiyan, N.P. Cheremisinoff. CRC/Taylor & Francis Group, Boca Raton, FL (2005). 255 pp., US$ 139.95, ISBN: 0-8247-2247-7

In this book, the authors discuss (in my opinion extremely thoroughly) gasification techniques that can be carried out in one of many different reactor configurations such as: fixed bed; fluid bed; bubbling, circulating, entrained twin bed; moving bed; rotary kiln; and cyclonic. Each technology is discussed to provide the reader with a working knowledge of the process as well as a view of each system's advantages and disadvantages. Each reactor configuration is illustrated by a simple line drawing.

The authors do not simply provide discussions of the numerous gasification processes. They go well beyond this to review gas cleanup systems (particulates, SO_2 and NO_2) as well as provide a list of technology suppliers for the aforementioned removal systems.

I was impressed by the amount of information provided in numerous fact-filled tables in Chapter 2: (1) gasification technology suppliers, (2) typical syngas composition, (3) manufacturers of gas cleanup systems, (4) summary of key characteristics of gasification technologies (6 pp.), (5) calorific value and compositions of syngas (3 pp.), (6) desirable syngas characteristics for different applications based on current technology and limitations (2 pp.), (7) partial listing of coal-based IGCC projects worldwide (3 pp.) and (8) gasification technology demonstration/pilot plant scale (30 pp.).

Gas cleanup, as noted above, is important to the production process. The topic is discussed in Chapter 5 and discussed very well, I might add. Indeed, this chapter is as well written as any text I have seen on air pollution control. Particulate removal systems are discussed first beginning with the simplistic gravity settling chamber and ending with condensation scrubbers. Equipment design, efficiency and costs are included for most systems. Following the discussion of particulate removal systems, gaseous pollutant treatment is reviewed. Packed towers, impingement plate/tray scrubbers and fiber bed scrubbers also are discussed. Much efficiency and cost data are reported.

Indeed, the whole book is resplendent with cost data and analysis of the operation and advantages of the systems reviewed.

I can do no better in describing the book's content than to repeat a synopsis found on the back cover. It reads:

> "*Gasification Technologies*: *A Primer for Engineers and Scientists* discusses gasification techniques and the benefits of each technology, including gas clean-up technologies and those used in hybrid systems and fuel cells. It also accounts for the primary products that are recovered and explains how these products are purified and can be used as fuel or for applications in petrochemical processes. The book describes the conditions in which optimal value intermediate products can be recovered, focusing on key factors such as oxygen and air blown reactors, operating temperature, internal and external heating, and reactor design. The authors also establish how gasificatin can help meet renewable energy targets, address concerns about global warming, and contribute to achieving Kyoto Protocol commitments."

Gary F. Bennett *
Department of Chemical and Environmental Engineering, The University of Toledo, Mail Stop 305, Toledo, OH 43606-3390, United States

* Tel.: +1 419 531 1322; fax: +1 419 530 8086.
E-mail address: gbennett@eng.utoledo.edu

2 May 2006

Available online 15 June 2006

doi: 10.1016/j.jhazmat.2006.05.110

Cyanide in Water and Soil: Chemistry, Risk, and Management, D.A. Dzombak, R.S. Ghosh, G.M. Wong-Chong (Eds.). CRC/Taylor & Francis Group, Boca Raton, FL (2006). 614 pp., US$ 169.95, ISBN: 1-56670-666-1

Cyanide is a potent human toxin (with its most toxic form, HCN, being infamous). That aside, cyanides are used extensively in gold mining and electroplating. In the latter application, solutions of metal cyanides are employed in baths into which metals are dipped to be coated. Additionally, cyanides are produced as by-products by a number of industrial processes such as coal coking and gasification, iron and steel manufacturing, aluminum manufacturing and petroleum refining. In addition, there are natural (plant) sources. The complexity of the compound as well as its inherent toxicity poses challenges to its treatment.

In this book, the editors have brought ". . .together current knowledge and information about cyanide release to and behavior in the environment. . ." They review control of releases and remediation of contaminated sites. In my opinion, they have done this exceedingly well. Thirty-five different authors have contributed 27 chapters, many of which include the editors as participating authors.

Chapter titles are as follows:

1. Introduction.
2. Physical and Chemical Forms of Cyanide.
3. Natural Sources of Cyanide.
4. Manufacture and the Use of Cyanide.
5. Physical-Chemical Properties and Reactivity of Cyanide in Water and Soil.
6. Biological Transformation of Cyanide in Water and Soil.
7. Analysis of Cyanide in Water.
8. Analysis of Cyanide in Solids and Semi-Solids.
9. Fate and Transport of Anthropogenic Cyanide in Surface Water.
10. Fate and Transport of Anthropogenic Cyanide in Soil and Groundwater.
11. Anthropogenic Cyanide in the Marine Environment.
12. Cyanide Cycle in Nature.
13. Human Toxicology of Cyanide.
14. Aquatic Toxicity of Cyanide.
15. Toxicity of Cyanide to Aquatic-Dependent Wildlife.
16. Human Health Risk Assessment of cyanide in Water and Soil.
17. Ecological Risk Assessment of Cyanide in Water and Soil.
18. Regulation of Cyanide in Water and Soil.
19. Cyanide Treatment Technology: Overview.
20. Ambient Temperature Oxidation Technologies for Treatment of Cyanide.
21. Separation Technologies for Treatment of Cyanide.
22. Thermal and High Temperature Oxidation Technologies for Treatment of Cyanide.
23. Microbiological Technologies for Treatment of Cyanide.
24. Cyanide Phytoremediation.