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Nota di contenuto	Front Cover; Related titles; Brewing Microbiology; Copyright; Contents; List of contributors; Woodhead Publishing Series in Food Science, Technology and Nutrition; Preface; Introduction to brewing microbiology; Brewing yeast; Process and product integrity; Waste valorization; References; Acknowledgments; Part One - Yeast: properties and management; 1 - Yeast: an overview; 1.1 Yeast species/strains used in brewing and distilling; 1.2 Yeast cell structure; 1.3 Comparison of lager and ale yeast; 1.4 Flocculation; References; 2 - Yeast quality assessment, management and culture maintenance1 2.2 Objectives of wort fermentation2.3 Brewer's yeast species; 2.4 Yeast management; 2.5 Storage of yeast stock cultures between propagations; 2.6 Preservation of yeast strains; 2.7 Yeast propagation; 2.8 Yeast collection; 2.9 Yeast storage; 2.10 Yeast washing; 2.11 Yeast stress; 2.12 Dried yeast; 2.13 Conclusions; Acknowledgments; References; 3 - Modelling yeast growth and metabolism for optimum performance; 3.1 Introduction; 3.2 Parameters influencing yeast growth and fermentation of barley malt; 3.3 Modelling: techniques and applications; 3.4 Advanced fermentation techniques

3.5 Future trends and sources for further information  
3.6 Closing remarks; References;  
4 - Advances in metabolic engineering of yeasts;  
4.1 Introduction; 4.2 Metabolic engineering; 4.3 Tools for metabolic engineering; 4.4 Strategies for metabolic engineering; 4.5 Brewing yeast genetics; 4.6 Targets for engineering of brewing yeast; 4.7 Future perspective; 4.8 Additional sources of further information; References;  
5 - Yeast identification and characterization; 5.1 Biodiversity and characterization of yeast species and strains from a brewing environment  
5.2 Microbiological, physiological, identification, and typing methods  
5.3 Brewing yeast cell count/viability/vitality methods; 5.4 Monitoring yeast and fermentation; References;  
Part Two - Spoilage bacteria and other contaminants;  
6 - Toxigenic fungi and mycotoxins in the barley-to-beer chain; 6.1 Introduction; 6.2 Barley malt: a key raw material in brewing; 6.3 Evolution of fungi in the barley-malt ecosystem; 6.4 Impacts of barley-associated fungi on malt quality; 6.5 Aspergillus, Penicillium and Fusarium mycotoxins; 6.6 Fate of mycotoxins in the barley-to-beer chain  
6.7 Regulation of mycotoxins in Europe  
6.8 Emerging mycotoxin issues; 6.9 Preventive actions; 6.10 Future trends; 6.11 Sources of further information and advice; References;  
7 - Gram-positive spoilage bacteria in brewing; 7.1 Introduction; 7.2 Beer-spoilage LAB; 7.3 Hop resistance mechanisms in beer-spoilage LAB; 7.4 Subculture and preservation methods of beer-spoilage LAB; 7.5 Other Gram-positive bacteria in brewing; 7.6 Concluding remarks; References;  
8 - Gram-negative spoilage bacteria in brewing; 8.1 Introduction: Gram-negative bacteria in brewing; 8.2 Acetic acid bacteria; 8.3 Zymomonas  
8.4 Brewery-related Enterobacteriaceae

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## Sommario/riassunto

Brewing Microbiology discusses the microbes that are essential to successful beer production and processing, and the ways they can pose hazards in terms of spoilage and sensory quality. The text examines the properties and management of these microorganisms in brewing, along with tactics for reducing spoilage and optimizing beer quality. It opens with an introduction to beer microbiology, covering yeast properties and management, and then delves into a review of spoilage bacteria and other contaminants and tactics to reduce microbial spoilage. Final sections explore the impact of micro

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