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INTRODUCTION to FOOD BIOTECHNOLOGY



Perry Johnson-Green

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BIOTECHNOLOGY

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Preface

Biotechnology is becoming increasingly important to food. In some industries (e.g., brewing), it is part of a process that has deep roots in human society, whereas many other applications of biotechnology are new to food production and processing systems. Food biotechnology is also new to consumers; its introduction sometimes leads to opposition from consumer groups and antibiotechnology activist groups. In some cases, opposition has been strong enough to influence government policy toward regulation of biotechnology.

However, many aspects of food biotechnology are virtually invisible to the consumer. Microbial products are increasingly common ingredients in processed foods, and the diagnostic tools used by the food industry to maintain food safety often have a biotechnological component. Consumers are becoming more aware of nutraceuticals and functional foods, and have enthusiastically embraced this aspect of biotechnology.

Food scientists, nutritionists, dietitians, and agricultural professionals must have a rich understanding of food biotechnology, because biotechnology has the potential to be used as a tool within each of these disciplines. For example, transgenic plant biotechnology can be used to modify food or to improve its performance as a component of a processed food. Plants can also be modified to have higher nutrient or vitamin contents, increased levels of health-promoting compounds, or decreased levels of toxins or allergens. Transgenic plant technology has already been used extensively to improve the efficiency of food production, and there will be more applications of this sort in the future. One of the main objectives of this book is to lay a solid foundation in all areas of food biotechnology that can also be used as a springboard to careers in biotechnology. Readers will acquire an understanding of the language used in biotechnology, as well as the biological and chemical concepts that are important in each field. One of the major themes is biological diversity — the fount of most biotechnological innovation. Biotechnologists need to appreciate how the natural world has provided important tools to enhance technology. Another theme is the frequent use of examples. Some examples are currently used in the food industry, whereas others are taken from the research literature.

Food professionals also need to be aware of the controversial aspects of food biotechnology. The final chapter reviews ethical and regulatory issues, but an effort has been made to discuss them throughout the book. For example, Chapter 4 includes a discussion of the potential of transgenic plants to harm nontarget insects such as the monarch butterfly. Chapters 3 and 7 also have sections devoted to specific controversies in food biotechnology (bovine growth hormone and eosinophilia–myalgia syndrome, respectively).

Each chapter closes with a list of recommended reading. These are a mixture of general sources which provide a wide range of supporting material for topics covered in the chapter and, more specific, which support examples used in the book. The order of the lists corresponds to the sequence of topics in the chapter.

This book has benefited greatly from interactions and feedback with students in Food 3413 over the years. I am also indebted to Sheila Potter for training in Corel Draw and Krista Patterson for administrative support. Finally, I thank Julia Green-Johnson for her continual encouragement and advice.

Author

Perry Johnson-Green has taught a senior course in food biotechnology since 1995, as well as courses in food microbiology, sensory science, and human biology at Acadia University in Wolfville, Nova Scotia. He has been involved in a wide range of research, covering neuroscience, plant-microbe interactions, and the potential use of plant-derived antimicrobial compounds as food preservatives. Current research topics include interactions between probiotic yeast and mammalian cell function. A member of the Canadian Institute of Food Science and Technology, the Canadian Botanical Association, and the Institute of Food Technologists, he frequently participates in public discussions on consumer issues in food biotechnology.

