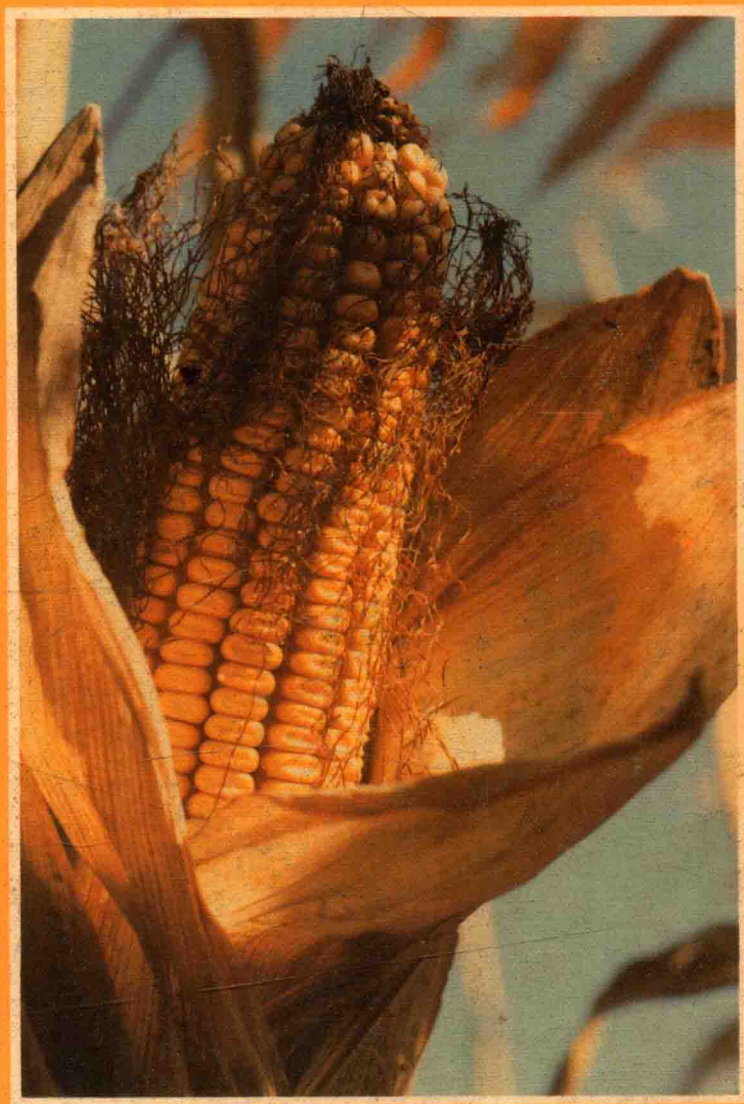


CORN

Chemistry and Technology



Stanley A. Watson and Paul E. Ramstad, editors

Corn: Chemistry and Technology

Edited by
Stanley A. Watson
Paul E. Ramstad

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PREFACE

This is a book about a most remarkable cereal grain, *Zea mays* L., maize, or, as it is better known in the United States and Canada, corn. We realize that it is called "maize" in most other countries, but for uniformity, we have used the term "corn" throughout this book except in a few instances where "maize" seemed more appropriate. Since this is a technical work of worldwide interest, we have preferred to use metric and SI units throughout, with the English equivalents or conversion factors given for those readers not accustomed to using metric units. The symbol "t" is used to denote metric tons (tonnes).

Corn is indigenous to North America. It was developed by Central American natives many centuries before Columbus saw it. Corn was the foundation of the extensive North and South American ancient civilizations and was important in the agriculture of more recent Indian populations. Although Columbus carried corn seed to Europe, where it became established as an important crop in southern latitudes, it was the opening of the fertile plains of the midwestern United States that accelerated the development of modern corn culture. These developments were brought about, first, through work of ingenious farmers and, later, through the efforts of many research scientists.

In countries where corn is an important crop, it is the principal component of livestock feeds, and most of it is fed to farm animals. In only a few countries is corn a major constituent of human diets. In developed countries, corn is consumed mainly as popcorn, sweet corn, corn snacks, and occasionally as corn bread. However, most consumers are not aware that corn plays an important role in the production of meat, milk, and eggs or that corn is an important source of the sweeteners, starches, oil, and alcohol used in many foods, beverages, and numerous other products.

Much of the importance of corn is derived from its low cost, which is the result of corn's high productivity. Although, at this time, the major corn-growing areas seem to have a large surplus of corn in storage, a burgeoning population will need more food, and a drought or other natural disaster could lead to rapid utilization of the surplus. Therefore, research on improvement in productive efficiency and new uses of corn will continue. Progress in utilization of corn is dependent on new information on the physical, chemical, and biological properties of corn resulting from research by chemists, engineers, food scientists, nutritionists, and other researchers.

Corn is important in international trade. In recent years, it has been a major agricultural export of the United States, Argentina, Brazil, South Africa, Thailand, and Rumania. The United States, as the world's largest producer, has also been the largest exporter. Most corn gluten feed, a by-product of the growing corn wet-milling industry, is exported from the United States. Recent replacement of sucrose by high-fructose corn syrup in the United States has had a major impact on the economies of countries exporting sugar to the United States, but this development, together with development of a fuel ethanol

business in the United States, has had a favorable effect on utilization of the U.S. corn crop.

Although other books on the chemistry and technology of corn have been published, none is recent. Much new knowledge is contained in this book. Authorities in many fields have contributed chapters or have reviewed manuscripts. Among them are agronomists, geneticists, entomologists, mycologists, food scientists, chemists, engineers, and economists who hold responsible positions in universities, government, and industry. Anyone interested in any aspect of corn research and development, marketing, utilization, etc., should find this volume useful. The editors, as representatives of The American Association of Cereal Chemists, are grateful to each of the authors and reviewers. We also wish to thank the AACC staff for their advice, help, and technical editing. We also owe thanks and appreciation to the Agricultural Research and Development Center, The Ohio State University, Wooster, Ohio, for use of facilities and to secretaries Georgia Miller and Gwen Alaura, photographer Ken Chamberlain, and draftsman, Newell Hartrum.

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Corn: Chemistry and Technology

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