

Microbiological Quality of Foods

Edited by

L. W. SLANETZ, C. O. CHICHESTER, A. R. GAUFIN,

and Z. J. ORDAL



Microbiological Quality of Foods

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PREFACE

Foodborne diseases and problems relating to the sanitary and microbiological quality of foods continue to be of major interest and concern in this and other countries of the world. Such foodborne diseases as salmonellosis and staphylococcal food poisoning actually appear to be on the increase in the United States. New problems have been created due to recent developments in the processing and handling of foods. Little is known about the role of foods in the transmission of virus diseases. There is still no general agreement as to the types of microbiological tests and the standards that should be established to maintain the safety and quality of many foods.

The specific aims of this conference on the Microbiological Quality of Foods were to review the present state of knowledge of foodborne diseases and to discuss the use and efficiency of microbiological tests and standards for food quality from the academic, regulatory, and industrial standpoints. Problems related to the use of microorganisms as an index of food quality were given special attention. This included a consideration of total counts, coliforms, fecal streptococci, and the detection of specific pathogens. A particular effort was made to point out and emphasize areas needing further research.

The conference was jointly sponsored by the Environmental Sciences and Engineering Study Section of the National Institutes of Health and the Department of Microbiology, University of New Hampshire. It was supported by Research Grant EF106 provided by the Division of Environmental Engineering and Food Protection, Bureau of State Services, Public Health Service. The following members of the above Study Section assisted in developing plans for the program: Dr. C. O. Chichester, University of California, Davis; Dr. A. R. Gauffin, University of Utah; Dr. Z. J. Ordal, University of Illinois; and Mr. Irving Gerring of the National Institutes of Health. Acknowledgment is also made of the assistance and advice received from Dr. L. E. Goresline, Quartermaster Food and Container Institute; Dr. K. H. Lewis, Taft Sanitary Engineering Center; Dr. W. L. Mallmann, Michigan State University; Dr. C. F. Niven, Jr., American Meat Institute Foundation; and Dr. G. G. Slocum, Food and Drug Administration. The assistance of this group in the development and planning of this conference was most helpful.

Ninety-five selected speakers and participants attended the conference,

44 from universities or research institutes, 35 from federal or state government agencies, and 17 from industry. Seven foreign countries were represented. Many of the foremost authorities in the field of food microbiology presented papers or participated in the conference discussions. Special thanks are due the speakers for the excellent papers they presented and for their cooperation in preparing their manuscripts for publication. The published Proceedings of this conference should be of interest to everyone concerned with problems relating to the microbiological quality of foods.

*University of New Hampshire
Durham, New Hampshire
October, 1963*

L. W. SLANETZ
Director of Conference

Introductory Remarks

WESLEY E. GILBERTSON

Division of Environmental Engineering and Food Protection, Public Health Service, U.S. Department of Health, Education, and Welfare, Washington, D. C.

In this conference, I find the sense of considerable gratification. Some of you may recall as I do, a meeting at the Sanitary Engineering Center a short five years ago, where the topic of discussion was whether or not research proposals in the food sciences were eligible for support under the grant programs at the National Institutes of Health. At this meeting, Dr. Gordon Seger of the National Institutes of Health corrected a popular misconception that NIH grant funds were exclusively for medical research. With this clarification, the Environmental Sciences and Engineering Study Section, which is co-sponsoring this meeting today, undertook the stimulation of research in this important area, and we have seen grant support for food research grow from the modest two or three projects at that time, to the present level which exceeds \$2,000,000 a year.

I am glad that the ESE Study Section chose to sponsor a symposium in this important area. Surely a conference, structured as this one, to probe in depth the many factors of the food microbiology problem, cannot fail to provide us with greater clarity in our thinking and a better basis for the judgments we must make. I should like to commend Dr. Slanetz and his planning committee for their fine work in developing the pattern of discussion. I am impressed with the range of topics and with the speakers who will present them. I appreciate this opportunity to renew acquaintances and to meet many of you who heretofore I have known only through the medium of your work.

There is another factor about this meeting which I mention in a more personal way. This conference is being supported by a grant from the Division of Environmental Engineering and Food Protection. This is significant because it reflects a development of comparatively recent date. Although control of environmental factors has been the very foundation of public health in the past, it has occupied to a large extent an ancillary position to other programs. Environmental health is now emerging as a discrete entity in the public health picture with stature comparable to other major program components. In the Public Health

Service we now have a functional grouping of five divisions of the Bureau of State Services which are concerned with air, water, food, radiation, and occupational health to achieve a more cohesive approach to the total problem of environmental health. There is legislation before both Houses of the Congress which, if enacted, will permit this grouping to be given full Bureau status. In the planning for the establishment of this Bureau, an early decision was reached that environmental health divisions should conduct grant programs to foster and develop extramural research in the respective program areas. Thus, the ability of the Division of Environmental Engineering and Food Protection to support this conference is important, not just from the standpoint of the conference, but from the broader view of enhancing the potential for bringing research in the food sciences and other facets of environmental health to a status more commensurate with present day demands for scientific information. This step, with its attendant responsibilities of program planning and budget justification, should give greater visibility to these areas and permit more accurate assessment of the dimensions of the research needs.

In this regard, I should like to take a moment to comment briefly on our needs for scientific information. The Bureau of State Services deals substantially with the ultimate product of research, the translation of scientific information into the kinds of practice that bring about environmental changes conducive to better health. Thus, the needs for information in the field of food microbiology are for the kinds of data which will clarify problems and permit development of effective countermeasures for the hazards resulting from interaction between microbes, foods, and man.

Development of counter measures is required in the fulfillment of one of our important functions—the provision of technical assistance to state and local health agencies and industry in the control of public health problems.

In the course of developing program guides and similar documents, we become at times acutely conscious of vacuums in scientific information. In such instances, we can only make professional judgments based on the best information available. In so doing, we seek the counsel of the best people we can get—people who can reflect viewpoints of all sides of a problem. For example, in the past few months we released a new manual on sanitation for the food service industry. This was developed by our Milk and Food Program staff with the substantial assistance of a special advisory committee composed of people from public health, research, and industry. They brought together elemental facts derived from the research and observations of many disciplines. In this endeavor and

in other similar projects, we draw heavily on the "bank account" of scientific knowledge. We hope that those of you in research will continue to make regular deposits so that this account may be kept in balance.

The complexities of modern life dictate an expanding research effort to provide the kinds of information required to cope with the changing environment. As the population expands, wastes increase, the metropolitan and rural environments tend to merge, and technology produces new materials and products; the experimental background becomes progressively deficient, and new factors must be studied and equated with classical concepts. To meet this challenge, we intend to press for more adequate support for both the intramural and extramural research programs, including development of Centers for Environmental Health recommended in the report of the Committee on Environmental Health Problems, chaired by Dr. Paul M. Gross of Duke University. (Dr. Mrak and Dr. Dack, members of the Food Subcommittee, are scheduled speakers on the Symposium.) There is an item in our present supplemental appropriation bill to provide the funds needed for acquisition of a site for the center and for the development of structural plans.

Time does not permit a detailed discussion of the specific functions of such a center but I should like to take time to cite to you some of the committee's general conclusions:

"That a national need exists for establishment and maintenance of a vigorous and integrated effort to maintain controls over the human environment compatible with projections of change in both population and the environment itself.

"That accommodation to the National needs in environmental health will require the establishment of a strong focal center adequately staffed and equipped to prosecute an effective and integrated program within the Public Health Service and to manage and coordinate a strong extramural research, training, and technical support program utilizing the available institutional resources of the nation.

"That an adequate legislative basis for a sufficient national program in environmental health does not exist at present."

In the detailed planning for implementation of the general recommendations, our concept calls eventually for competent Centers for Environmental Health in the various broad program areas embraced. These will be closely linked but identifiable units. One of these, we believe, should be a center for food research and technology.

In closing, I should like to stress the importance of identifying and studying the public health problems of our changing environment. I have not alluded to specifics purposely because I feel sure that the speakers who follow will delineate many of the problems in food microbiology in

precise terms. As the picture of environmental health problems change, so must the work relationships on the local, state, and federal levels change with respect to meeting this problem. The Public Health Service recognizes that it alone cannot combat the complex situation that now faces us, but that we must work together with other governmental agencies and the institutions of our country in a joint effort. For this reason, we pledge our support to those of you who desire to study and attack these problems and we urgently seek your assistance. We are vitally interested in what you accomplish at this conference, and we sincerely hope that your aims of determining some of the specific research needs on the microbiological quality of foods will be attained, and that they will stimulate research in solving some of the problems involved with the safety of foods in this country.

Introductory Remarks

DR. G. A. ROHLICH

University of Wisconsin, Madison, Wisconsin

As Chairman of the Environmental Sciences and Engineering Study Section, it is my pleasant opportunity and privilege to be able to speak in its behalf at this conference. As you probably know, the Study Section receives research proposals for review in the field of environmental health and I would like to point out that its membership is made up of a multi-disciplinary group because we receive applications not only in the food science field but also in occupational medicine, water supply and pollution control, radiological health, and air pollution.

We, of course, in reemphasizing what Mr. Gilbertson has said, are very much interested in the broad concept of environmental health and recognize the importance of this particular area. To that end the study section has sponsored several conferences. The first was a general conference entitled "Man Versus Environment." Second, a conference on the "Physiological Aspects of Water Quality." The third conference that we sponsored was occupational medicine. This is the fourth of the conferences in which we have taken direct interest. Each of these has been for purposes which have already been outlined by Dr. Slanetz and Mr. Gilbertson. Principally, we are interested in establishing where we stand in research in a particular field, what are the greatest research needs for the future, and who are the people who can be stimulated to work on such research activities. I think Dr. Slanetz and his committee are to be congratulated on the excellent program they have arranged here.

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