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SYMPOSIUM ON CURRENT STUDIES ON THE CHEMISTRY OF FOOD IRRADIATION

Introduction

The worldwide need for a means of food preservation that is safe, effective, and energy conserving has been reaffirmed from Boston (MIT, 1959) to Bombay (IAEA, 1972). For more than 20 years, several hundred researchers throughout the world have studied every aspect of the irradiation of food, so that the billions of people who are undernourished or malnourished might enjoy a food supply that would provide them with adequate nutrition, free of food-borne diseases, at a cost within their economic resources. Understandably, the health authorities must be assured that the process does not augur any unforeseen hazards for the consumer, although 20 years of testing has revealed none. Unfortunately, administrative approvals of irradiation preservation are bogged down in the morass of bureaucracy which attempts to decide whether irradiation is an "additive" or a "process". In the meantime, millions of dollars are dedicated to the conduct of animal feeding studies to demonstrate the safety of each product being considered for approval for human consumption.

Many early studies by chemists recognized that elucidation of the chemical changes produced in food by irradiation would have a favorable impact on the evaluation of the safety of irradiated food. The first symposium on this topic, held in Atlantic City, was sponsored by the Division of Agricultural and Food Chemistry of the American Chemical Society, and the proceedings were published in *Advances in Chemistry Series* No. 65. In 1971 another symposium called "Recent Advances in the Chemistry of Food Irradiation" was held in Los Angeles at the 161st National Meeting of the American Chemical Society, and the papers were published as a monograph issue of *Radiation Research Reviews* (Vol. 3, No. 4).

Because of the high cost of animal feeding studies, and more significantly, the understanding which chemists have developed of radiolytic changes, the study of the chemistry of food irradiation has gained a preeminent role in establishing the basis for evaluating the wholesomeness of irradiated food. Recent guidance from WHO and the regulatory agencies of various countries has indicated that data on the formation of radiolysis products will be requested in support of animal feeding studies, and ultimately, it may be expected that evaluation of product safety will be made on the extrapolation of wholesomeness data developed from correlations of chemical studies with feeding studies. From a more sophisticated viewpoint, it may even be postulated that, when sufficient knowledge has been acquired, the quality of food may be assessed on a molecular level in relation to its composition and the corresponding physiology of the components present.

It was appropriate, therefore, that a symposium held in Mexico City in December 1975 at the First Chemical Congress of the North American Continent would bring together experts in the areas of study relating to the radiation chemistry of various food components. The papers from that symposium, published here, present most of the current understanding of the radiation chemistry of lipids, proteins, carbohydrates,

and nucleic acids as food components, and of food itself. This compilation thus represents not only a state-of-the-art survey of current knowledge but points the way toward further work needed to complete the understanding of the relationships involved among food components and their absorption of ionizing energy. Especially, it is hoped that greater use will be made of the knowledge concerning the changes which occur in food upon processing with the effect these changes may have upon its wholesomeness.

The studies of the chemistry of food irradiation have led to a great fund of knowledge concerning this method of preservation. It is unfortunate that less is known about the older and generally used preservation methods. The effects of heating, for example, are certainly more destructive to food than radiation, but there appears to be no impetus for detailed study, so less is known.

The symposium was sponsored jointly by the American Chemical Society, The Chemical Institute of Canada, and the Mexican Chemical Society. In addition to scientific papers presented at the symposium, a survey of the food irradiation studies being conducted in Mexico was presented by Professor L. M. Cabrera of the Mexican Center for Nuclear Studies and a translation of that presentation is included here. The paper entitled, "Chemical Aspects of Irradiating Frozen Aqueous System", presented by Dr. I. A. Taub is not available for publication.

As organizing chairman of the symposium I wish to thank the participants in the symposium for their splendid contributions and cooperation in preparing the manuscripts; and especially, I thank my colleagues, Drs. P. Angelini and I. A. Taub who gave invaluable advice and assisted in many ways with the myriad details of organization.

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