

SYMPOSIUM ON BIOGENESIS OF FLAVOR COMPONENTS

Introduction

The primary objective in most flavor research to date has been to identify the volatile constituents responsible for the characteristic flavor and aroma of foodstuffs. Application of modern analytical methods (particularly gas chromatography-mass spectrometry), combined with sensory evaluation at each stage of analysis, has resulted in the identification of "character impact" substances in a considerable number of foodstuffs. The substances identified generally occur in traces and include an astonishing variety of organic compounds, representing many functional group classes, varying degrees of unsaturation, and chain branching and often including isomeric forms.

Many of these flavor components are produced by fresh fruits or vegetables or in microbial systems. It is intriguing to the biochemist to consider the biogenetic mechanisms whereby the synthesis of these volatile substances is accomplished and controlled in such biological systems. In turn, the consideration of potential biogenetic pathways can provide important leads to the identity of unknown flavor components. Ultimately, knowledge of the biosynthetic pathways and control mechanisms will make it possible to enhance the production of desirable flavor components and reduce or eliminate the production of off-flavors.

The Symposium on Biogenesis of Flavor Components was arranged to review and update research on the biogenesis of volatile constituents which contribute to food flavor, including actual or potential utilization of the results in the food and flavor industries. The following series of five papers represents a selection from this Symposium.

The three shorter papers illustrate the biogenetic approach as applied to specific situations. In two cases (cheese and papaya) the authors were able to produce superior products based on the results of their research. The third paper indicates the involvement of a particular enzyme in the production of a naturally occurring volatile substance.

The two longer papers on bananas and black tea review recent advances and propose biosynthetic pathways for a substantial number of the volatile constituents believed to play a role in the typical flavor of these foods. These pathways were derived by application of sophisticated biochemical-bioanalytical techniques, including radioactive tracers, isolation of enzymes capable of catalyzing some of the proposed reactions, demonstration of the presence of expected intermediates or precursors, and demonstration of reactions in model systems. Nevertheless, the present knowledge of the actual biosynthetic pathways in these two systems (and in others discussed at the Symposium) is still fragmentary and often speculative. Even less is known about the factors which control the biosynthesis or accumulation of particular flavor volatiles.

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