TECHNICAL SECTION

JOURNAL OF Agricultural and Food Chemistry

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Antibiotics in Long-term Food Preservation; Spontaneous Heating in Stored Grains

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• A survey of the possible applications of antibiotics in the long term preservation of food is presented by Lewis and Michener. Three possible applications for antibiotics are discussed. A highly stable antibiotic might be used to maintain bacterial spores in a static condition for the shelf life of the product. An antibiotic might be developed which would stimulate germination of the bacterial spores and kill the bacteria in a vegetative phase. An antibiotic might exert a synergizing effect with heat in bringing about the total eradication of both spores and bacteria. An antibiotic which would be synergistic with heat in killing the bacteria could be of economic importance if it allowed a reduction in the heat processing schedules of normal food processing. Results of processing at lower than normal temperatures using the antibiotic subtilin are reported. • In the summer of 1948, workers at a soybean processing plant in Illinois noted vapors rising from the top of a concrete storage bin containing 100,000 bushels of soybeans. Several days later, soybean oil began to exude through the walls to such an extent that pools of oil formed around the outside base of the bin. Such spontaneous heating of stored soybeans is being encountered more frequently with this grain than any other seed crops. Milner and Thompson present an analysis of two similar cases. Spontaneous heating of soybeans progresses through characteristic biological, chemical, and physical phases. Heating initiated by mold growth reaches a maximum of 55° C. and is carried forward to higher temperatures by nonbiological oxidation with progressive browning of the seeds. In the last stages, grains resemble compressed pellets of oil-soaked coke, markedly different from the appearance and chemical properties of soybeans heated in a furnace. They conclude that the exothermic nature of protein-sugar interactions (Maillard reaction), probably catalyzed by protein-trace element complexes, is a major cause of spontaneous chemical heating in agricultural materials.

Search for Synergists Sheds Light on Mechanism of Action of Insecticides

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• Insecticide synergism, in which combinations of compounds exhibit a higher biological activity than the sum of the activities of the individual compounds, comes in for a review by Sumerford. Industry became aware of the value of synergism in the 1930's and *N*-isobutylundecylenamide, the first important synergist commercialized for pyrethrum, was introduced in 1938. The author tabulates various combinations, methods of application, and the degree of enhanced activity and attempts to account for the potentiation in the activity of the mixtures on the basis of physical properties, chemical behavior, or biological activities of one or more of the components. He notes that the advantages of synergists should stimulate searches for new ones and points out that such an exploration discloses strong antagonists for the biologically active material in question, thus throwing more light on mechanisms of action.