

# Food Industry Shifting from Chemical to Physical Technology

## Toxicological determination of suitability of food additives outlined

LOS ANGELES.—Companies that have not planned for the food industry of tomorrow by making food physics a part of their regular research and development program may find that neglect of such new developments as automation, radiation sterilization, or ultrasonic processing will be disastrous, John P. O'Meara, Southwest Research Institute, said at the recent 14th annual meeting of IFT here. Some observers thought that O'Meara's presentation sounded a note that has been needed for a long time of the need for food technologists to know more about physics and its application to food processing, and that his paper could well serve as the high spot in leading a change, believed to be a long overdue one, in emphasis in food technology.

O'Meara, after reviewing a number of the contributions of physics to modern food technology, stated that the successful applications in the past have come about more by chance than by design, and that no concerted effort has been made to initiate ways to utilize physics in the food industry. Currently, we do not have many physical methods of analysis upon which process control instruments can be based, he said. O'Meara recognized that the advantages of process control instruments based on physical measurements may not impress the chemical analyst responsible for routine

quality control, but said that the production man knows that process control out in the plant cannot be satisfactorily achieved without such instruments.

The need of physical probes that will reach into a process stream and reveal how many molecules of a certain type are present, and probes which can measure particle-size distributions, was stressed. O'Meara also thinks that we need to be able to measure objectively such elusive qualities as "body," "bloom," "sweetness," "astringency," and "bouquet." He called the development of physical methods for measuring these properties "food physics research."

He cited as an example a current research program being conducted at Southwest Research Institute for Corn Industries Research Foundation concerning the development of rapid physical methods of analysis, with appropriate process control instrumentation, for measuring moisture in various products of the corn wet-milling industry. In solving this problem, nuclear magnetic resonance spectroscopy was applied, involving the detection of resonance absorption of radio frequency energy by the hydrogen nuclei in a semi-dry, solid-like starch, and determining how many of those hydrogen nuclei are present as absorbed moisture.

**Toxicological Determinations.** If a chemical is to be accepted as a compo-

nent of foods for which standards have been established, it is necessary that evidence of the harmlessness and innocuousness of the food additive be presented to FDA, usually at a formal hearing. In some cases, when standardized foods are not involved, this evidence may be presented to FDA at a private hearing. For standardized foods, the onus of proof must be borne by the manufacturer, but it is up to the Government to prove that a chemical is deleterious when it is added to a non-standardized food product. In reviewing these requirements, Harry J. Deuel, Jr., USC, stated that while in some cases it may require several years to amass the evidence to prove unequivocally the harmlessness of a compound, the information necessary to assure oneself—and the FDA—of the harmlessness of the product may be considerably abbreviated when the metabolism of a substance is known or when it can be correlated with a recognized pattern of catabolism.

Dr. Deuel cited as an example the information supplied which resulted in the approval of sorbic acid as a fungistatic agent. Sorbic acid is a 6-carbon dienoid acid which compares with caproic acid, normally found in some fats. First LD<sub>50</sub> values were higher for sorbic acid and sodium sorbate than for sodium benzoate, showing that greater quantities of sorbate could be tolerated. Comparative toxicity tests of sorbate and benzoate when administered to rats at several levels were summarized. Final proof of the harmlessness of sorbic acid was greatly simplified because it was possible to demonstrate that the acid followed the same pattern of metabolism as do naturally occurring fatty acids.

Charles N. Frey (right), consultant formerly with Standard Brands, receives the Nicholas Appert Award from Stanley F. Brockington, IFT Chicago section chairman. Right: The 7th Babcock-Hart Award went to E. J. Cameron, director of re-

search for National Canners' Association. Carlos A. Greenleaf, NCA, (left) accepts the award in behalf of Dr. Cameron, whose illness prevented him from receiving it in person. C. G. King, Nutrition Foundation, presented the award

