

The third example is concerned with engineering studies of pasteurization processes. In the most common process used today, the length of time required for the product to traverse the holding tube and the efficacy of the controls used to prevent its forward flow when underheated are of prime public health concern, because they determine to a large degree whether the process will be effective for the inactivation of pathogenic micro-organisms (10). Studies done in the research pilot plant have shown that present methods of measuring or calculating holding times for viscous products, such as ice cream mix and egg yolk, are inaccurate. The actual holding time for the fastest flowing component in the holding tube may be 45 percent less than indicated. These studies have precipitated a reevaluation of these processes and, in the case of egg pasteurization, adjustment of the operating conditions so that proper holding times are obtained.

Laboratory evaluation is an important feature of the cooperative State-Public Health Service program on interstate shipment of milk. The laboratories that test the milk are regularly surveyed to determine whether they are uniformly applying prescribed methods (11). A representative of the milk sanitation research staff visits each State central milk laboratory every 3 years. Laboratory survey officers are certified after they have demonstrated the ability to survey local milk laboratories. This program has been instrumental in standardizing and improving the procedures used to examine milk in over 500 laboratories in the United States (12). In addition to the surveys made of laboratories, split samples of milk are sent to each State and local laboratory, and the results are analyzed for accuracy. The uniformity of the split sample results has indicated rapid and progressive improvement over the 10 years this program has been in operation. The laboratory evaluation activity is supported by research on methods (13, 14), and by the participation of the research staff in regional seminars, training courses, and conferences with State and local laboratory personnel.

CONTRIBUTIONS FROM FOOD CHEMISTRY

The food chemistry unit conducts research and provides technical assistance on a variety of health-related problems associated with foods. Characteristically, the unit carries out intensive investigations in specific areas of concern rather than attempting to cover the entire field of food chemistry at any one time. Also, we attempt to balance the work between problems requiring immediate solution and those of a more basic nature concerning the potential hazards relating to changes in man's environment. The areas of research that have been emphasized in the food chemistry unit include public health problems associated with paralytic shellfish poison and other marine toxins (15, 16, 17), the presence and significance of radionuclides and pesticides in foods (18, 19, 20), research and technical services concerning the development and evaluation of standard methods of analysis (21), and the exploration of instrumental methods of analysis for application in the field of food protection (22, 23).

Current activities of the food chemistry unit include the exploration of gas chromatographic procedures for the determination of toxic or otherwise undesirable substances in food, the development of chemical methods for the direct measurement of fecal pollution and for the identification and enumeration of bacteria, and the development of an indicator test for measurement of heat treatment applied to commercial egg products.

Instead of simply listing projects, two projects are discussed that illustrate the scope and philosophy of food chemistry activities.

In recognition of the potentially harmful effects of radioactive fission products to man and the importance of food, particularly milk, as a major vector of exposure, the food chemistry unit was requested in the early months of 1957 to develop a program of research in this area, which has been continued over the past 10 years. The high points of the work include (a) the development of rapid methods of analysis for specific radionuclides (24), which are suitable for surveillance of milk and other foods; (b) the establishment of a pilot surveillance network that demonstrated the feasibility of a nationwide monitoring program to assess the levels of exposure to man from his foods (25); and (c) the development of commercially feasible methods for the selective removal of fission products of biological significance from milk by use of properly charged ion-exchange resins, without appreciable change in the flavor or nutritional quality of the product (26, 27).

Another problem of current interest in food chemistry is the concentration and distribution of trace elements in food. Although the biological significance of