Examinations of Danish milk and butter for contaminating organochlorine insecticides

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I. Introduction

In 1961 the Municipal Food Control Laboratory at Århus, Denmark, started analytical examinations of Danish milk and butter to establish the content of organochlorine pesticide residues. The material chosen was milk delivered to six local dairies, and the analytical work was based on paper-chromatographic methods. The results obtained through this initial work showed that certain contaminations were prevalent, and it was decided to extend the work to include both examination of samples from the whole of the country and more thorough local examinations. At the same time, more efficient methods of analysis by means of gas chromatography were introduced. Furthermore, as part of the extension of the work, a close co-operation was established with the National Pesticide Laboratory, Copenhagen. This laboratory directed the country-wide examinations and afforded an in-
creased analytical capacity for supplementary investigations, especially for the analysis of animal feed.

The purpose of the examinations, which are still going on, has been to establish whether Danish dairy products are contaminated by contents of persistent organochlorine pesticides, and, if so, in which quantities, and also, if possible, to trace some of the sources which might account for a contamination demonstrated. The results presented here include all samples drawn until the end of 1966.

II. Kinds of material examined

Throughout the period of examination the sampling programme was as follows:

*Milk delivered to six local dairies* in the Århus area was sampled regularly every three months during the period 1962-1966. These samples were compositions representing about 100 producers delivering to the dairy on the same day. For practical reasons samples were taken from each producer at the delivery to the dairy and taken to the laboratory where the final samples were composited and mixed in the ratios in which the individual producers delivered to the dairy on that same day. A total of 179 fluid milk samples representative of the production of the six dairies was taken during the period in question.

*Milk samples from individual farms.* During a period of 12 to 14 months, one monthly sample of milk was taken from each of 20 selected farms which had daily deliveries of milk to dairies in Århus. In these well-organized farms with controlled working conditions, records were kept on the animal feeding as well as on the use of pesticide chemicals, which afforded very good cooperation and the best possibilities of obtaining further information. About 260 samples of fluid milk were taken from the farms during this period.

*Butter samples from the whole of the country* were obtained by the assistance of the inspectors of the State Quality Control of Dairy Products and Eggs, etc. through a monthly sampling programme during the period 1964-1966. The country was divided into six regions having almost the same total productions, and butter samples were taken monthly from one or two dairies chosen at random within each region and sent to the laboratory; 381 butter samples representative of the Danish butter production during the three-to-four year period of examination were taken.

*Animal feed.* Supplementary to the milk and butter sampling a considerable number of animal feed samples for analysis were taken at different points of the programmes. From the 20 farms mentioned above, samples of feeding beets (swedes) of own growing as well as samples of commercial feed mixtures used at the farms were taken in October 1964 and June 1965. Furthermore, samples were drawn from a variety of different plant material used for the feeding of cows in two selected farms, for example, alfalfa, silage,