

MONSANTO CHEMICALS LIMITED
RESEARCH AND DEVELOPMENT DEPARTMENT
RUABON

AT31545

London Information Centre (2)
Newport Information Centre (2)
Ruabon Information Centre (2)
J.W. Barrett, London
D.V.N. Hardy, London
R.A. Baxter, Ruabon
J.H. Mainprize, Ruabon

H.A. Vodden, Ruabon ✓
W.R. Richard, St. Louis
M.W. Farrar, St. Louis
E.P. Wheeler, St. Louis
R.E. Keller, St. Louis
E.S. Tucker, St. Louis

LECTURE REPORT

Lecture: Problems of Identifying Small Residues of Pesticides.
By: Professor G. Widmark, Institute of Analytical Chemistry,
University of Stockholm.
At: Society of Chemical Industry, 14 Belgrave Square, London.
On: 20th October, 1969
Attended by: D.V.N. Hardy, R.A. Lidgett.

INTRODUCTION:

The meeting, an ordinary meeting of the Pesticides Group of the Society of Chemical Industry was attended by approximately fifty people. Professor Widmark's talk lasted one hour.

DETAILS:

Professor Widmark introduced his talk with a description of the functions and facilities of his department at the Institute of Analytical Chemistry, University of Stockholm. The department is responsible for the application of physical analytical methods in the following fields:

- (a) Residue Analysis
- (b) Polyaromatics
- (c) Organo lead compounds
- (d) Lipids
- (e) Tobacco Smoke
- (f) Head Space Volatiles.

(a) and (d) can be considered together in wild life residue analyses.

It was evident from the lecture that the instrumental technique receiving most attention from Widmark and coworkers (Leif Bergstedt (m.s.) and Bruno Nucci Organo lead and Residue Analysis) at the present time is combined gas-chromatography/mass spectrometry and approx. 80% of the lecture was concerned with this aspect of their work - in particular identification of polychlorinated biphenyls.

Widmark was especially careful to differentiate between identification of p.c.b.'s using g.c./m.s. and quantitation of p.c.b.'s. In the former case there is good evidence that the technique is capable of providing reliable qualitative information but measurement of p.c.b. levels by gas chromatography or mass spectrometry is not considered a sufficiently reliable or accurate technique at present. This is mainly because the electron capture responses of the individual p.c.b. components in any chromatogram are not known and the detector cannot therefore be calibrated; in addition the complexity of the mixtures is such that complete resolution of all components is unlikely to be achieved under normal analytical conditions.

As an example of the case of misinterpretation of gas chromatograms when retention data alone is used, chromatograms of a sewage mud extract supposedly containing Dieldrin and D.D.T. were shown before and after sulphuric acid treatment. It was evident from these that neither of the supposed contaminants was present.

The use of the microcoulometer for quantitative analysis of p.c.b.'s is not recommended by Widmark - reasons given were (a) difficulty in complete combustion of the materials and (b) a "detector volume" factor which gives broader peaks preventing the use of high resolution columns.

As mentioned earlier emphasis is being placed upon the use of combined g.c./m.s. for identification of residues and it is evident that considerable capital is being invested here. The g.c./m.s. equipment is of L.K.B. manufacture and this has been coupled to a comprehensive and versatile data acquisition system of French origin. With this equipment it is now possible to obtain usable mass spectra of quantities at the level of 0.5 nanogram or lower of D.D.T. type material. Slides were shown of the integration of C.R.O. traces at various m/e values (usually 4 mass numbers per trace) and the use of the integrated traces for accurate mass measurement seems quite feasible.

The Institute of Analytical Chemistry at present offers an analytical service to external bodies in the various fields of interest - prices quoted for typical p.c.b. analysis (presumably identification of p.c.b.'s in a residue) was quoted as £12-£30 per analysis. Widmark is hoping to extend this service to enable treatment of samples prior to mass spectrometry to be carried out at the University by outside workers thus increasing the throughput of the g.c./m.s./data acquisition system.

From his lecture Widmark gave the impression of being a very cautious scientist unlikely to draw conclusions without strong supporting evidence.

R.A. Lidgett

R.A. LIDGETT

RAL/BWG
22.10.69

MONS 037676