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Photolysis Studies on the Organophosphorous Insecticide Phosmet in Model Systems and in the Presence of Wool Wax

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Katrin Sinderhauf

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für meine Oma

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PRELIMINARY REMARKS

The work presented in this thesis was carried out under the supervision of Prof. Dr. W. Schwack at the Institut für Lebensmittelchemie, Universität Hohenheim, from May 2001 to October 2004. Parts of this work have already been published in international peer-reviewed journals:

- SINDERHAUF, K., SCHWACK, W. Photolysis Experiments on Phosmet, an Organophosphorus Insecticide, *Journal of Agricultural and Food Chemistry*, **2003**, 51 (20), 5990-5995,
- SINDERHAUF, K., SCHWACK, W. Optimised synthesis of the ^{15}N-labelled insecticide phosmet (1), *Journal of Labelled Compounds and Radiopharmaceuticals*, **2004**, 47, 509-512,
- SINDERHAUF, K., SCHWACK, W. Photodegradation Chemistry of the Insecticide Phosmet in Lipid Models and in the Presence of Wool Wax, Employing a ^{15}N-Labelled Compound, *Journal of Agricultural and Food Chemistry*, **2004**, 52 (26), 8046-8052,
- SINDERHAUF, K., SCHWACK, W. Photodegradation of Phosmet in Wool Wax Models and on Sheep Wool – Determination of Wool Wax Bound Phosmet by means of Isotope Ratio Mass Spectrometry, *Journal of Agricultural and Food Chemistry*, **2005**, 53 (12), 4873-4879,

or was presented at international scientific conferences:

- K. SINDERHAUF, W. SCHWACK Photochemisch induzierte Reaktionen von Phosmet, 31. Deutscher Lebensmittelchemikertag 2002, Frankfurt am Main, 9.-11-September 2002, *Lebensmittelchemie* **2003**, *57*, 35.
- K. SINDERHAUF, W. SCHWACK Photochemically induced Reactions of the Insecticide Phosmet with Particular Regard to Nonpolar Lipid Environments, DEFENSE des CULTURES – CROP PROTECTION Unicum Colloquium, Group Français des Pesticides, Mediterranean Group of Pesticide Research, Aix en Provence, Frankreich, 20. – 24. Mai 2003
- K. SINDERHAUF, W. SCHWACK Photochemically induced Reactions of the Insecticide Phosmet with Particular Regard to Nonpolar Lipid Environments, EURO FOOD CHEM XII, Strategies for safe food Brügge, Belgien, 24. -26. September 2003.
- K. SINDERHAUF, W. SCHWACK Photoreaktionen von Phosmet in Gegenwart von Lipiden, 32. Deutscher Lebensmittelchemikertag 2003 im Rahmen der GDCh-

Jahrestagung 2003 München, 6.-11. Oktober 2003, *Lebensmittelchemie* **2003**, *57*, 161-162.

- K. SINDERHAUF, W. SCHWACK – Studien zum Photoabbau von Phosmet in Wolle und Wollfett unter Einsatz eines stabilisotopenmarkierten Wirkstoffes, 33. Deutscher Lebensmittelchemikertag 2004 Bonn, 13.-15. September 2004, *Lebensmittelchemie* **2004**, *58*, 136.

Chapters 2-5 of this thesis are in form identical with the full publications 1-4. Recurring figures have been omitted, chemical structures have been numbered consecutively, and a combined directory of references was created.

To clarify the participation and contributions of each author, named in the publications, it is explained in the following:
All practical preparative and analytical work was performed by **Ms. Sinderhauf**. This included the isolation and synthesis of phosmet and the realization of all irradiation experiments in model systems as well as in lanolin and on sheep wool. Furthermore, she carried out all sample preparations and all HPLC and HPLC/MS measurements. The isolation of photoproducts including the structural identification by means of MS, IR and NMR was accomplished by Ms. Sinderhauf. She also performed all wool fat sample preparations and the corresponding measurements via EA/IRMS. The analysis and interpretation of the obtained data was carried out by her, as well as the preparation of the complete manuscript including the figures.

Professor Schwack was the supervisor of this work. He initiated the idea of photolysis experiments with phosmet in the presence of wool fat, and recommended also the application of the proved model systems. He advised on analytical questions and problems. Proof-reading of all manuscripts and corrections in terms of formal and textural aspects were done by him and he also functioned as an advisor throughout the publication processes.

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