

A Stereoselective Approach in Official Quality Control of Cypermethrin Formulations

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Introduction

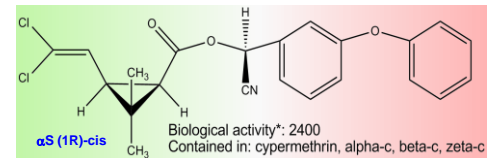
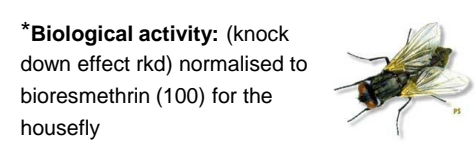
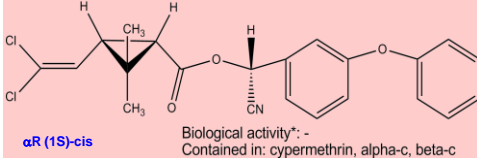
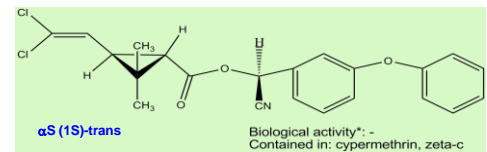
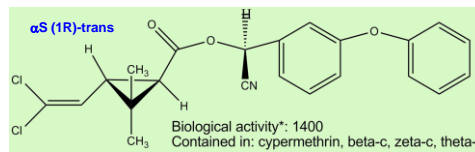
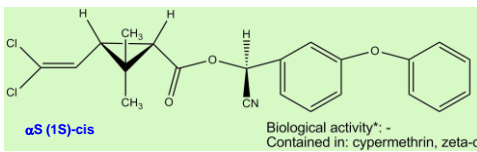
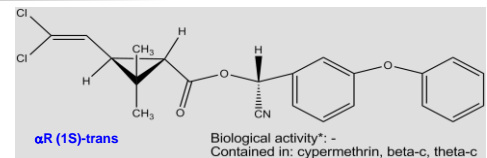
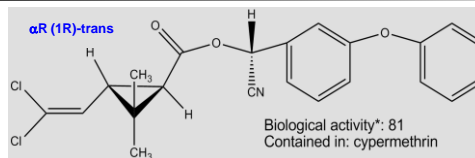
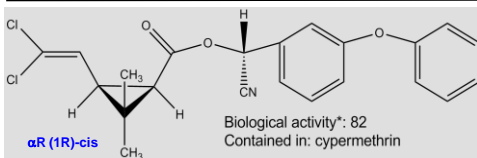
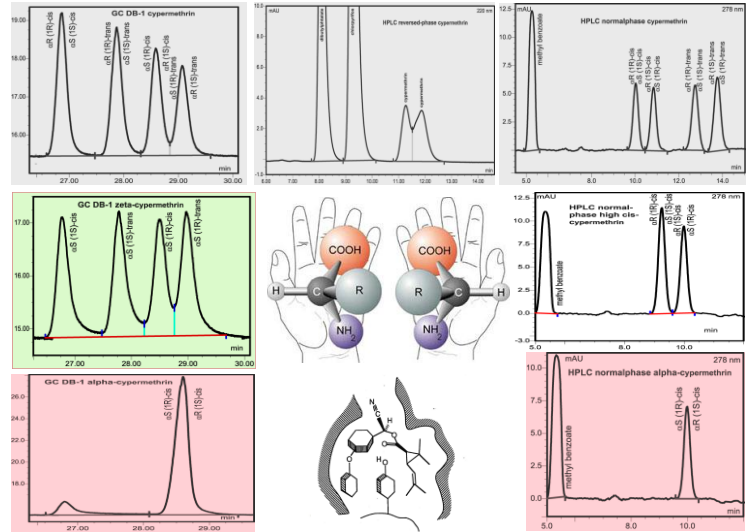
Several cypermethrins for agricultural use are registered in Switzerland:

- cypermethrin, alpha-cypermethrin, zeta-cypermethrin
- but not beta- and theta-cypermethrin

The different types of cypermethrins show large differences in their stereoisomers composition and hence in efficacy. Therefore, the assessment of stereoisomer composition has to play an important role in official quality control of cypermethrin formulations.

Available CIPAC methods

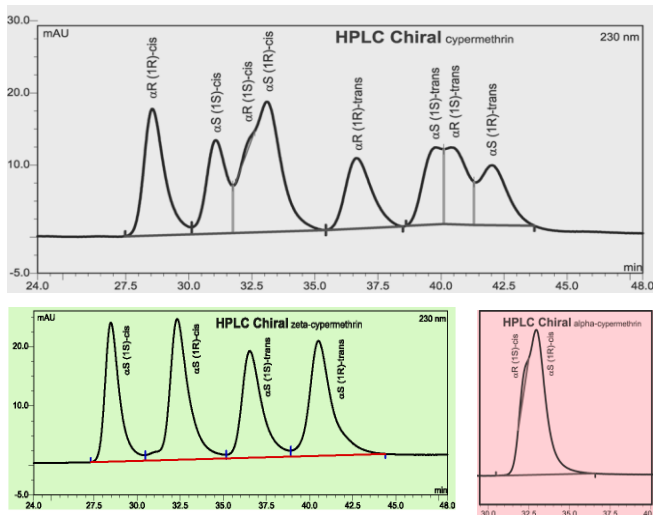
- handbook 1C p 2028 ff GC-FID packed column method and normal phase HPLC-UV method
- handbook F MT 163 identity test with different spectroscopic and chromatographic methods
- handbook H p 14ff alpha-cypermethrin GC - FID



Stereoisomer nomenclature according to Rothamsted used

Method description

- column: Shiseido Chiral 5u CD-PH 0A, 250 x 4.6mm
- mobile phase: hexene : isopropanol 99.3: 0.7 v/v
- injection: 10µl; detection: 230nm; flow: 0.5ml/min
- sample: 50mg ai in heptane:isopropanol 80:20



Conclusion

- no CIPAC method available to simultaneously determine the cypermethrin content and stereoisomer composition in formulations
- the recombination of the information gained with different methods has to be combined to get complete information on identity and content of cypermethrin formulations
- the CIPAC method and a stereoselective analytical method are necessary for the official quality control of cypermethrin formulations

References

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- Hua Kuang et al, Enantioselective determination of cypermethrin in pig muscle tissue..., Int. Journal of Food Science and Technology 2010, 45, 656-660
- „Cypermethrin“, M.J.Tandy *et. al.* in Analytical Methods for Pesticides and Plant Growth Regulators (G.Zweig/J.Sherma Eds.), Volume XIII, Academic Press Inc. Orlando 1984