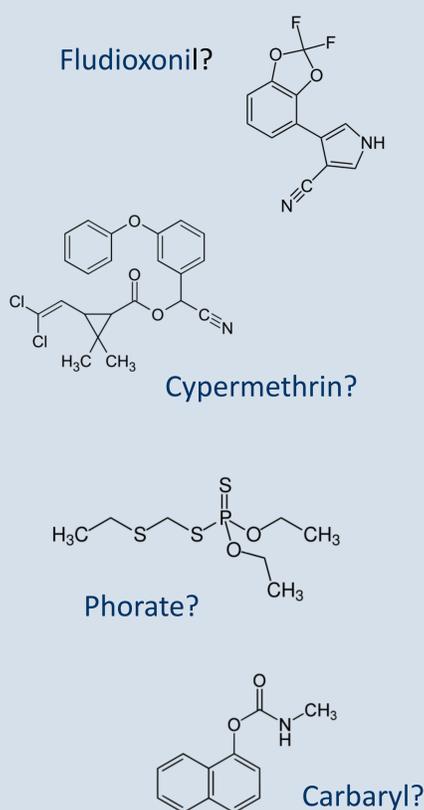


Investigation of plant protection products for endocrine effects by direct bioautography

Highlights

- ✓ Streamlined discovery of estrogen-like plant protection products (PPPs) by HPTLC combined with planar Yeast Estrogen Screen (pYES)
- ✓ Screening of 60 PPPs for their estrogenic activity → thereof, 10 PPPs showed ER α -mediated estrogen-like effects!
- ✓ Transferring this investigation to food samples, fenhexamid could be detected and verified in white table grapes (Figs. 1 and 2).
- ✓ Biodensitometry for quantification of the blue fluorescent 4-methylumbelliferone (MU), indicating estrogen-like PPPs; dose-dependent curves were determined for 6 PPPs (Figs. 3 and 4), exemplarily shown for fenhexamid (Fig. 5).
- ✓ The developed direct bioautography method proved to be suited for residue analysis of estrogen-like PPPs in very complex food matrices at the trace level.

Which do you get for free?



Detection of estrogen-like PPPs in complex food matrices

- Grapes, tomatoes and white wines were crushed and extracted with *n*-hexane – diethyl ether. After HPTLC-pYES estrogen-like PPPs were evident.
- Exemplarily, for verification of the finding of fenhexamid in white grapes, this extract was not only compared with standard compounds (Fig. 1), but also investigated by overlapped application (Fig. 2).

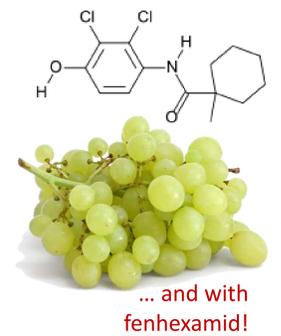


Fig. 1 HPTLC-pYES bioautogram at UV 366 nm of a white table grape extract (A) containing an unknown estrogen-active zone (*) versus a mixture of the two PPPs (B) fenhexamid (a) and fludioxonil (b)

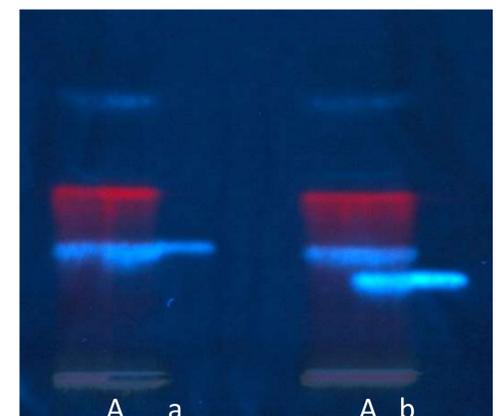


Fig. 2 HPTLC-pYES bioautogram at UV 366 nm showing the overlapped application of a white table grape extract (A), either with fenhexamid (a) or fludioxonil (b); both 15-mm bands overlapped 7.5 mm

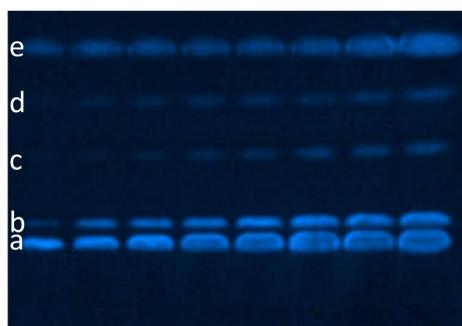


Fig. 3 HPTLC-pYES bioautogram at UV 366 nm of 5 estrogen-effective PPPs:

- fludioxonil (8-250 ng/ band)
- fenhexamid (25-500 ng/ band)
- carbaryl (8-60 μ g/band)
- cypermethrin (6-400 μ g/band)
- phorate (5-100 ng/band)

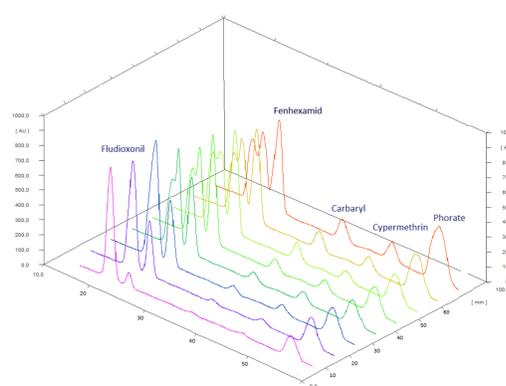


Fig. 4 HPTLC-pYES densitograms of the 5 estrogen-effective PPPs measured via their MU-fluorescence at 366/>400 nm

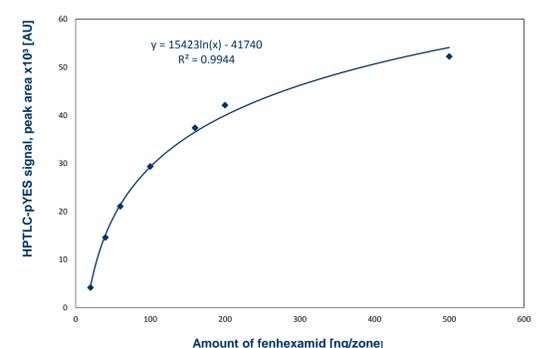


Fig. 5 Dose response curve of fenhexamid obtained by HPTLC-pYES

