

2. BIOSENSOR SYMPOSIUM

TÜBINGEN 2001

<http://barolo.ipc.uni-tuebingen.de/biosensor2001>

Chitosan based Butyrylcholinesterase Biosensor for the Pesticide Detection

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Registriernummer der Online-Anmeldung: 185

Poster

The increasing concern for ground water pollution, due to the use of pesticides in agriculture, requires a strong effort in order to detect pollutants with reliable, economical and rapid methods; some pollutants like pesticides and heavy metals, in fact, are very dangerous for human health. Pesticides are highly toxic compounds and some of them are powerful inhibitors of enzymes involved in nerve functions. It is true that they show low environmental persistence but they have acute toxicity and therefore, there is a demand for fast screening methods for low concentrations of these pollutants [1].

Detection methods currently used (LC, GC-MS) are not suitable as rapid screening methods, as they are time consuming and provide only discontinuous analysis [2].

In this study, our goal was to develop a rapid and cheaper method for pesticide analysis. It is based on the potentiometric determination of the inhibiting properties of the pesticides on the cholinesterase activity. The enzyme butyrylcholinesterase is immobilized on the surface of the pH-electrode by using chitosan membrane, then the measuring conditions (pH, temperature, ionic strength) were optimized. On the other hand, organic phase stability of the enzyme electrode was also tested. A temperature of 25 °C and pH 8.5 were found to be optimum conditions. All measurements were carried out in 2.5 mM borate buffer (pH 8.5) at 25 °C. Furthermore, dependence of enzyme inhibition on the pesticide concentration and the regeneration conditions of inhibited enzyme were achieved.

Literatur

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- [2] Scwedt, G., Hauck, M., Fresenius, Z. (1988) *Anal.Chim.Acta.*, **252**, 7.