

2. BIOSENSOR SYMPOSIUM

TÜBINGEN 2001

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A Lipoxygenase Sensor for Essential Fatty Acid(EFA) Determination

Seçil Önal, Suna Timur, Erol Akyılmaz, Azmi Telefoncu

Ege University, Faculty of Science, Biochemistry Department, 35100-Bornova-Izmir/TURKEY

Tel. 90 232 3438624

<mailto:tatar@sci.ege.edu.tr>

Registriernummer der Online-Anmeldung: 186

Poster

The essential fatty acids(EFAs) are a group of 12 compounds, but linoleic acid and α -linolenic acid are the only EFAs which are found in the diet, particularly in vegetable oils, in some abundance. The other on EFAs are either metabolic products of linoleic and α -linolenic acids or are found in the diet especially in marine foods, considerably smaller amounts [1]. The steadily growing knowledge about the correlation between the fatty acid composition of the diet and clinical disorders leads to a growing demand for a rapid and easy to use analytical device for fatty acid determination in foods [2]. Up to date, the fatty acid composition of fats and oils is determined mainly by gas chromatography(GC), although GC is well established in lipid analysis and offers high sensitivities, it is still time consuming and laborious .

In this study, we describe the development of enzyme sensors for the determination of ω -3 and ω -6 fatty acids from the mixture of EFAs. Since linoleic and α -linolenic acids show differences in first and second oxygenation activities, it is possible to analyse each of them in EFAs mixture. Lipoxygenases in general catalyse the oxygenation of polyunsaturated fatty acids containing a *cis*, *cis*-1,4-pentadiene system by molecular oxygen. The oxygen consumption due to the lipoxygenase catalysed oxygenation of EFAs monitored amperometrically. Lipoxygenase was immobilized on the surface of oxygen electrode by using different membrane systems. Each systems were compared with regard to linear ranges of the calibration plots, sensitivities, detection limits. Furthermore, optimization of working conditions(pH, temperature etc.) and stability tests were also studied.

Literatur

- [1] Simopoulos, A. P. (1994) Fatty acids. In *Functional Foods*, Ed. I. Goldberg, pp.355-392. Chapman and Hall, New York.
- [2] Schoemaker, M., Feldbrügge, R., Gründig, B., Spener, F., (1997) *Biosens. Bioelectron.*, **12** (11), 1089.