BIOSENSOR SIGNAL IN THE MIXTURES OF BIOGENIC AMINES

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Biogenic amines (BAs) are produced during the microbial decarboxylation of amino acids and their content serves as a good biomarker for the determination of food quality. In protein-rich foods e.g. fish and meat, mixtures of BAs are formed during spoilage. High levels of BAs in food are toxic. For sensitive persons even low concentrations of biogenic amines can represent health risks, as the detoxification of these compounds depends on an individual.

Commonly BAs are determined with chromatographic methods, which are very selective and sensitive, but require laborious and time consuming pre-treatment of samples. Biosensor including pea seedlings diamine oxidase (PSAO) for amines biorecognition is a fast and simple method for determination of BAs. The activity of PSAO toward different BAs varies and our earlier studies have shown that different biogenic amines have different effect on the resulting signal of PSAO based biosensor [1, 2]. The aim of the present study was to characterize the resulting biosensor signal in the mixtures of cadaverine, putrescine, spermidine and histamine and calculate the effective impact parameters for each individual substrate for the calibration of these biosensors using the dynamic model of biosensors [3].

The applied model showed a good correlation with experimental results in the mixtures of four BAs:

$$A = \sum_{i=1}^{4} \frac{m_i x_i}{K_i + (m_i + 1)x_i}$$

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