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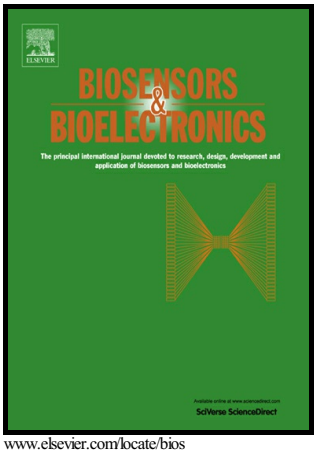

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Abstract

Amino acids (AAs) of nutritional importance exist as L-isomers, while D-isomeric form of AAs is common constituent of bacterial cell wall. The presence of D-amino acids in foods is promoted by harsh technological processes (e.g., high temperature, extreme pH, adulteration or microbial contamination). The detection of free AAs in different brain disorders is also very important. Among the various methods available for detection of AAs, most are complicated and require time-consuming sample pre-treatment, expensive instrumental set-up and trained persons to operate, specifically for chromatographic methods. The biosensing methods overcome these drawbacks, as these are simple, fast, specific and highly sensitive and can also be applied for detection of AAs in vivo. This review presents the principles, merits and demerits of various analytical methods for AA determination with special emphasis on D-amino acids (DAA) and L-amino acids (LAA) biosensors. The electrochemical AA biosensors work optimally within 2 to 900 s, pH range, 5.3 to 9.5; temperature range, 25°C to 45°C; AA concentration range, 0.0008 to 8000 mM, limit of detection(LOD) between 0.02-1250 µM and working potential from -0.05 to 0.45 V. These biosensors measured AA level in fruit juices, beverages, urine, sera and were reused 200 times over a period of 7 to 120 days. The use of various nanostructures and electrochemical microfluidic paper based analytical device (EµPAD) are suggested for further development of AA biosensors.