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ACCEPTED MANUSCRIPT

Fast and direct amperometric analysis of polyphenols in beers using tyrosinase-modified screen-printed gold nanoparticles biosensors

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Abstract

In this work it is explored a real applicability of miniaturised and portable biosensing technology for the estimation of total phenolic content in 15 different commercial beers by applying direct amperometry. Gold nanoparticles screen-printed electrodes were thoroughly modified with tyrosinase (Tyr-AuNPS-SPCEs), which was immobilised on the surface by crosslinking with glutaraldehyde. All chemical and instrumental variables involved in the electrochemical method were optimised to develop a reliable and powerful tool to estimate rapidly the content of phenolic compounds in complex beer samples. Catechol, phenol, caffeic acid and tyrosol were analysed individually using the proposed methodology and good analytical and kinetic performances were obtained. Total phenolic content in tested beers (high fermented, low fermented and non-alcoholic) were expressed as mg L^{-1} of tyrosol, which is one of the major phenolic compound reported in beer. Moreover, the developed amperometric methodology successfully benchmarked was against standardised Folin-Ciocalteau spectrophotometric method with a good Pearson correlation (r=0.821, p<0.01).

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