Electrochemical tongue

Identification

Key words	electrochemistry, electrochemical, voltammetry, analytical chemistry, taste, PCA, discrimination, classification, Identification, sensor array, biosensor, amperometry, multicomponent analysis
Latest version	2010/12/08
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How does it work?

Primary objective	Analytical tool
Working principle	The principle behind the electrochemical tongue is based on chemical reactions taking place in a solution at the interface of an electron conductor (a metal or a semiconductor) and an ionic conductor (the electrolyte), and which involve electron transfer between the electrode and the electrolyte or species in solution. An electrochemical tongue consists of an array of voltammetric or amperometric sensors. These sensors are in contact with the electroactive analyte and after applying a varying or constant potential, respectively, to the working electrode the resulting current is measured. Using an array of sensors working at different potentials, and combining multivariate signals with pattern recognition routines, it is possible to resolve between different electroactive compounds. Although the specificity of each individual sensor is low, the combination of several selectivity classes entails a very large information potential.
Images	
Additional effects	Not applicable, as this is a non-destructive technique
Important process parameters	
Important product parameters	pH, ionic strength and electrochemical activity of solvent and analyte (and possible presence of electroactive impurities)

What can it be used for?

Products	Liquid products
Operations	• Classification/discrimination of tea (3), wines (4,10,14,15), milk (5), oils, honey (13), beer (11) … • Determination of end of dishing and cleaning process (detergent detection) • Detection of microbial growth
Solutions for short comings	• better analysis and controls of suppliers and raw materials • checking raw materials • attests for coffee

What can it NOT be used for?

Products	Solid product, unless it can be completely dissolved
Operations	No restrictions
Other limitations	• Electrodes need to be cleaned or need to be self-cleaning • Complicated data analysis
Risks or hazards	No information

Implementation

Maturity	Pilot scale
Modularity /Implementation	Can be inserted in a process line.
Consumer aspects	No information – no problems expected
Legal aspects	No information – no problems expected
Environmental aspects	No information – no problems expected

Facilities that might be interesting for you

Further Information

Institutes	DiCTFA, CSIC - IATA, Masaryk University Biochemistry, UNIMORE DipSAA
Companies	Alpha M.O.S.

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