Analytica Acta-2013

OMICS Group Conferences
Accelerating Scientific Discovery

4th International Conference and Exhibition on
Analytical & Bioanalytical Techniques

October 15-17, 2013 Las Vegas, NV, USA

A simple electronic tongue for online monitoring of model fermentation

Matthias Gerstl
Austrian Centre of Industrial Biotechnology (ACIB), Austria

Abstract

Biotechnological fermentations are often very sensitive to changes in process parameters and even slight aberrations can lead to reduced yield or even to a complete failure. Therefore it is highly desired to have a powerful real-time online monitoring system to enable timely intervention when a process parameter is off limits [1]. A cheap way to realize such a system could be an electronic tongue. An electronic tongue can be defined as an array of non-specific sensors using advanced chemometric signal processing routines to classify a sample or to create an often multidimensional prediction of the compounds of a solution and their concentrations [2]. In recent years, accompanied by ever more powerful computers, electronic tongues have received increasing interest in such diverse analytical fields as food analysis [3] and bioprocess monitoring [4, 5]. While similar in principle, all uses of electronic tongues naturally differ in their choice of sensors and the signal processing algorithms.

In this contribution we present a simple electronic tongue consisting of an array of pure and modified noble metal microelectrodes. Cyclic voltammogramms were recorded on each electrode, data reduction was done using PLS and genetic algorithms were used for feature selection. With this setup it was possible to monitor glucose consumption and ethanol production encountered during yeast fermentation, while using cheap processing methods and materials and offering satisfying long term stability.

Biography

Matthias Gerstl studied chemistry and finished his PhD in electrochemistry in 2012 at the VUT and is currently a postdoctoral fellow at ACIB. He has authored/co-authored eight papers in international peer reviewed journals.