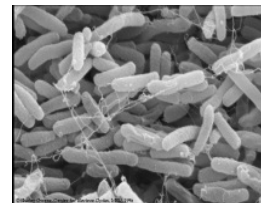


# ELECTROCHEMICAL OPTICAL WAVEGUIDE LIGHTMODE SPECTROSCOPY (EC-OWLS) FOR ESCHERICHIA COLI DETECTION

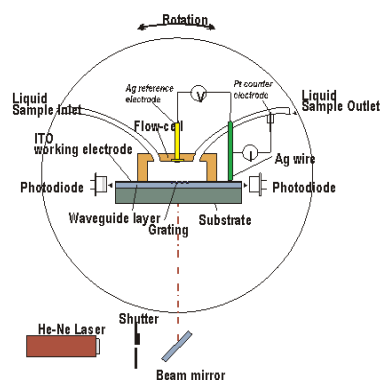
## Abstract

Escherichia Coli is a Gram-negative non-spore forming rod and a representative microorganism in the enteric bacteria. It is also considered as index microorganism in the food industry.

Electrochemical Optical Waveguide Lightmode Spectroscopy (EC-OWLS) combines evanescent-field optical sensing with electrochemical control of surface adsorption processes. A layer of indium tin oxide (ITO) serves as a conductive electrode for electrochemical sensing and together with the other glass-type layers of the sensor functioned as a high refractive index waveguide for optical sensing.



## Measuring setup

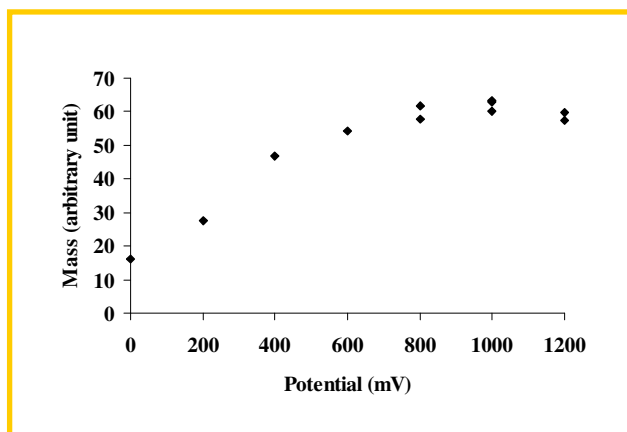


## Sample preparation

E. coli strain (NCAIM B.00200, <http://www.uni-corvinus.hu:8089/NCAIM/framezet.jsp>) was grown in BHI broth shaking on 37°C for 18 hours.

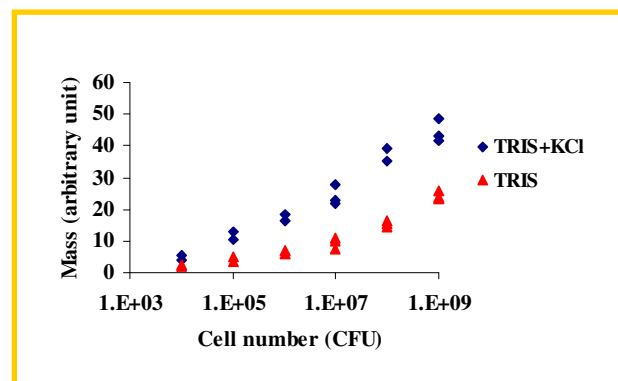
## Calculated mass of immobilized cells as the function of polarizing potential

The effect of polarization potential on the adsorption of the E. coli cells onto the sensor surface was investigated. Sample of  $10^8$  CFU/ml bacteria suspended in buffer solution was injected into the flow-through cuvette. The polarization potential was changed between 0-1200 mV.



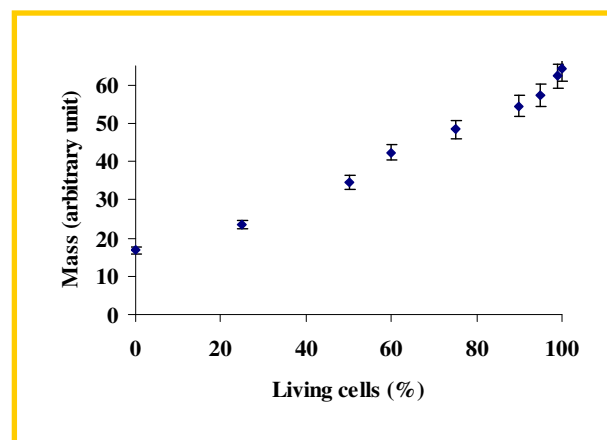
## Calibration curve of lactobacillus cell concentration

Calibration curve of the bacteria count from  $10^2 - 10^8$  CFU/ml suspended in buffer solution was obtained on the basis of three replicate samples. Considering the effect of conducting salts on the electrochemical measurements, the results showed that the peaks measured with buffer solution containing KCl salt resulted higher signals than without the salt.



## Sensor response of different rate of living and damaged cells

Based on the measuring principle, this measurement can not be selective to E. coli cells, but it could show a quick estimation about the number of living bacteria cells in different samples.



## References:

Adányi, N., Németh E.; Halász A.; Szendrő I.; Váradi M.; Application of electrochemical optical waveguide lightmode spectroscopy (EC-OWLS) for studying the effect of different stress factors on lactic acid bacteria. Anal Chim Acta 573-574, (2006) 41-47.