In situ microbial fuel cell-based biosensor for organic carbon

The biological oxygen demand (BOD) may be the most used test to assess the amount of pollutant organic matter in water; however, it is time and labor consuming, and is done ex-situ. A BOD biosensor based on the microbial fuel cell principle was tested for online and in situ monitoring of biodegradable organic content of domestic wastewater. A stable current density of 282±23mA/m² was obtained with domestic wastewater containing a BOD₅ of 317±15mg O₂/L at 22±2°C, 1.53±0.04mS/cm and pH 6.9±0.1. The current density showed a linear relationship with BOD₅ concentration ranging from 17±0.5mg O₂/L to 78±7.6mg O₂/L. The current generation from the BOD biosensor was dependent on the measurement conditions such as temperature, conductivity, and pH. Thus, a correction factor should be applied to measurements done under different environmental conditions from the ones used in the calibration. These results provide useful information for the development of a biosensor for real-time in situ monitoring of wastewater quality.

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