

The development of biochemical oxygen demand sensor using local yeast : candida fukuyamaensis UICC Y-247

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Abstrak

ABSTRACT

In order to shorten the measurement time of biochemical oxygen demand (BOD), a BOD sensor based on yeast metabolism was developed. Local yeast, Indonesian Origin, Candida fukuyamaensis UICC Y-247, was used as a transducer. The yeast was immobilized as a thin film in agarose matrix with the auxiliary of Nafion® acting as the membrane for ion exchange process. The film was then attached to gold-modified glassy carbons and used as transducer on the working electrodes. The measurements were conducted by observing the depletion of glucose concentration using multipulse amperometric method and then converted to BOD values. Optimum condition was observed in a waiting measurement time of 30 min at an applied potential of 450 mV (vs. Ag/AgCl). Linearity was shown in glucose concentration range of 0.1-0.5 mM, which was equivalent to BOD concentration range of 10-50 mg/L. A detection limit of 1.13 mg/L BOD could be achieved. Good repeatability was shown by a relative standard deviation (RSD) of 2.7% (n = 15). However, decreasing current response of ~50% was found after 3 days. Comparing to the conventional BOD measurement, this BOD sensor can be used as an alternative method for BOD measurements.