Journal of
Microbial & Biochemical Technology

OPEN ACCESS Freely available online

Short Communication

Microbial Biosensors: A Review

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ABSTRACT

A microbial biosensor is an analytical instrument with a biologically integrated transducer that provides a quantifiable signal indicating the analytic concentration. This approach is suitable for analysing extracellular substances and the environment, as well as for metabolic sensory control. Although microbial biosensors show potential for use in a variety of detecting applications, they have certain limitations. Although microbial biosensors show potential for use in a variety of detecting domains, significant drawbacks remain, including poor selectivity, limited sensitivity, and impractical mobility. Microbial biosensors have been combined with various newly emerging micro/nanotechnologies and utilised to a wide range of detection applications to overcome such restrictions. This review article examines micro/nanotechnologies that have been combined with microbial biosensors and highlights current developments and applications that have resulted from such innovative integration. Future perspectives on the integration of micro/nanotechnologies with microbial biosensors will be explored, as will the essential advances and enhancements.

Keywords: Microbial Biosensor; Microfluidics; Bioreactor.

INTRODUCTION

Biosensors are analytical instruments used to detect or distinguish particular components. Since Clark created the first biosensor in 1962 (1), biosensors have been widely investigated and extensively utilised in a variety of circumstances due to their tremendous potential. Biosensors are often classified according to their core platforms, which include antibodies, protein receptors (2), enzymes (3), and microorganisms. Because of their great specificity and sensitivity, enzymes and nucleic acid oligonucleotides have been used in the majority of biosensors in practical and clinical usage in recent decades (4).

Many improved microbial biosensors have been described in recent decades, showing promise for a wide range of applications. Microbial biosensors are analytical devices that are made up of a microbe that detects a target substrate and transforms the observed signal to a measurable response in a physiological, electrical, or biochemical manner.

As previously said, microorganisms such as bacteria and yeast provide a viable method for building microbial biosensors with several advantages. First, biosensors based on microorganisms have a significantly cheaper analytical cost for sensing components than other approaches using traditional instruments such as gas chromatography, liquid chromatography, mass spectrophotometry, and others (5).

CONCLUSION

The combination of micro/nanotechnologies with microbial biosensors, as well as their applications. Microbial biosensors have been the subject of extensive research in recent decades, but they appear to be restricted by a number of issues, including low sensitivity, poor selectivity, complex sensor architecture, and stochastic heterogeneity. To address such constraints, microbial biosensors have been combined with several modern micro/nanotechnologies as multidisciplinary convergence research has grown rapidly.

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Received: June 02, 2021; **Accepted**: June 17, 2021; **Published**: June 25, 2021

Citation: Moore J (2021) Microbial biosensors: a review. Journal of Microbial & Biochemical Technology. 13:.6.35248/1948-5948.21.13.475.