

ROLE AND USE OF BIOSENSORS IN AGRICULTURE

Kawaljeet kaur, Sneha Bhardwaj,
Dr. Anupamdeep Sharma &
Ankita Bhakri

ABSTRACT

The development of biosensors has been the focus of scientist's attention for current decades. Biosensors can centrally serve as low-cost and highly able devices for this aim in addition to being applied in other day to day applications. Biosensor is a device that consists of two central pieces: A bioreceptor besides a transducer. Bioreceptor is a biological factor that recognizes the target analyze and transducer is a physicochemical detector component that converts the recognition event into a measurable signal. Biomolecules such as enzymes, antibodies, receptors, organelles also microorganisms as well as animal and plant cells or tissues have been applied as biological sensing factors.

Key words: Biosensors, Microbial biosensor, Transducer, Pathogen detection

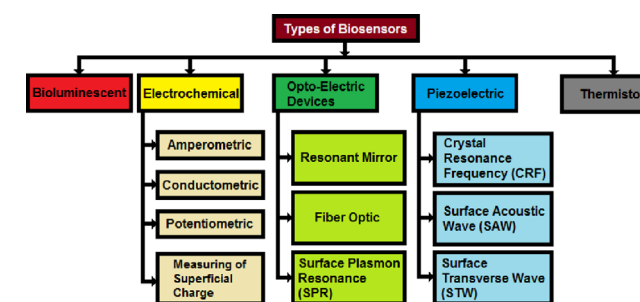
INTRODUCTION

The history of biosensors began in the year 1962 with the establishment of enzyme electrodes by the scientist Leland C. Clark. Since then, experiment communities from different areas such as VLSI, Physics, Chemistry, and Material Science have come together to develop more sophisticated, reliable and mature biosensing devices for applications in the fields of medicine, agriculture, biotechnology, as well as the military and bioterrorism detection and prevention. Biosensor is a device that consists of two main parts: A Bioreceptor and a transducer.

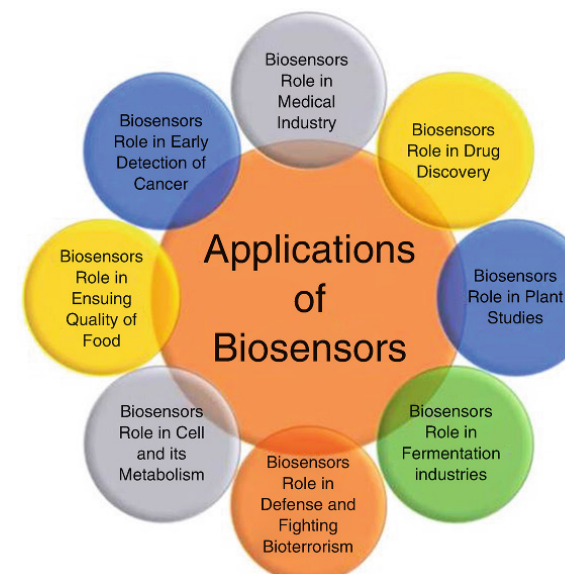
Bioreceptor is a biological component (tissue, microorganisms, organelles, cell receptors, enzymes, antibodies, nucleic acids, etc) that determines the target analyze. Difference fraction is transducer, a physicochemical detector component that changes the detection event into a measurable signal. The function of a biosensor depends on the biochemical specificity of the biologically active material.



TYPES OF BIOSENSORS



APPLICATIONS OF BIOSENSORS



BIOSENSORS IN AGRICULTURE

Agriculture includes the production of crops and the rearing of livestock producing various products which are used in daily life. These elements have always been susceptible to damage in the form of pests and diseases causing a loss in the profits. Hence, a way of increasing profits would be to reduce the loss of crops and livestock by such natural threats. With the advancement in bioterrorism, the need for biosecurity becomes very necessary. There have been cases where bacteria such as anthrax and virus such as the small pox have been deliberately propagated through livestock in order to infect the nation's population and inflict damage. Also, the need for biosecurity is essential when agricultural produce or any living object is to be transported across the international borders. Biosensors may play a major role in this field as they provide rapid and specific detection compared to the older techniques. Biosensors can be used to measure the levels of pesticides, herbicide and heavy metals in the soil and ground water. Biosensors can also be used to forecast the possible occurrence of soil disease, which has not been feasible with the existing technology..

FUTURE SCOPE

Cell and tissue-based biosensors consist of genetically engineered proteins that are infused into cells ex vivo or in vivo. Future work should focus on clarifying the mechanism of interaction between nanomaterials and Biomolecules on the surface of electrodes or nanofilms and using novel properties to fabricate a new generation of biosensors.

ADVANTAGES OF BIOSENSOR

Biosensors are sophisticated tools for detection and monitoring. Biosensors are more specific and provide more accurate readings. It is very easy to use.

DISADVANTAGES OF BIOSENSOR

Heat sterilization is not possible as this would denature the biological part of the biosensor. Cost is high. Reproducibility- it is not possible the same type of biosensor gives the same result. Its sensitivity sometimes may be a problem.

CONCLUSION

A biosensor is a device that detects, records, and transmits information regarding a physiological change or the presence of various chemical or biological materials in the environment. Biosensors combine the selectivity of biological system with the processing power of modern microelectronics to offer powerful new analytical tools with major applications in medicine, environmental diagnostic, food industries and agriculture.

