BIOSENSORS

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WHAT IS A BIOSENSOR?

It is a device that detects an analyte in a biological or chemical reaction and converts this response into an electrical signal. It is applied in a large variety of fields like medicine (which allows the detection, diagnose and treatment of different pathologies), environment (mesaruing, for example, the O2 concentration of the air), food, etc.







TYPES

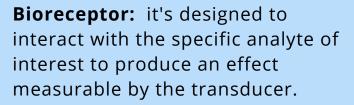
- Electrochemical biosensors are based on the reaction of an enzymatic catalysis that consumes or generates electrons (Redox).
- Optical biosensors detect the changes on the basis of absorption, fluorescence or light scattering.
- Piezoelectric biosensors mesure the electric charge that gets accumulated in solid materials in response to applied mechanical stress.







COMPONENTS



Transducer: where the biological response is converted into an optical, thermal or electrical signal.



Amplifier: amplifies the biological signal, which is generally very low



Electronics: it process the measurements



Interface: presentation of the

results

MEASUREMENT

- Potentiometric biosensors: use ion selective electrodes to determine changes in the concentration of chosen ions.
- Amperometric biosensors: measure the electric current (changes in voltage) associated with electron flow resulting from redox reactions.
- Conductometric biosensors: measure changes in the conductivity of a medium as a result of enzyme reactions that change its ionic composition.



THE POTENTIOSTAT

It is the electronic interface to a large category of amperometric chemical sensors which are capable of managing many biologically and environmentally important analyses.

ELECTROCHEMICAL CELL

The conductors of an electrochemical cell are called electrodes. They are used in trios in order to avoid the polarization effect:





Reference electrode: is an electrode which has a stable and well-known electrode potential and it is used as a point of reference in the electrochemical cell for the potential control and measurement.





