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BIOSENSORS AND FOOD TECHNOLOGY

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Abstract: *Food industry is an important and growing industry in the world. Food safety is also an important part of the industry. This demand of society can be overcome with the help of applicationof Biosensors in food industry. Biosensors are used for various purposes like processing, preserving, and packaging. Biosensors are safe and fast to use in the food industry. Biosensors are small, safe and easy to handle. It is a sensitive device and works in a cost-effective manner. Present review paper includes the applications of biosensors in food Technology.*

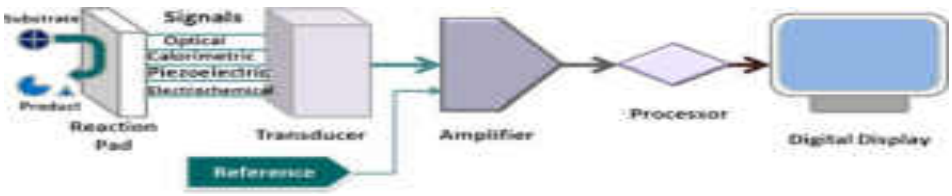
Key words: Biosensors, Food Safety, Food Technology, Applications.

Introduction

Food is a basic need of livinganimals. Food provides nutritional support to the body. As the population is goes on increasing rapidly the need of food also increasing. Fast life of human requires the packed and safe food. There is a global importance of food safety. This is due to sub equality foods being linked to increased morbidity, mortality, human suffering, and economic burden [1]. This demand of society can be overcome with the help of biosensors. Biosensors are examples of new, innovative methods. It became a powerful instrument in clinical, environmental and food analysis by tacking old but important problems [2]. Biosensors are used for various purposes in food industries. It is widely used in food processing, food production, food safety, securityfood packaging food supply. It is fast and safe process in food technology. Extensive development of biosensors for food safety and quality control were stimulated by acquiring several new food safety and key quality concepts during the last decade, such as Hazard Analysis Critical Control Points (HACCP), [3]. Total Quality Management (TQM), and ISO 9000 Certifications. The wave of terrorist acts and foodborne disease outbreaks has raised the importance of the food traceability and authentication [4, 5]. There are specific safety problems (pathogenic micro-organisms, BSE, GMF, pollutants, etc.) that require intensive control, data logging, and data treatments, which can be controlled effectively only with the new generations of bio detection systems [6]. All these tasks require rapid response sensors for new integrated data analysis systems and is an indispensable part of the modern supply chain operation paradigm

Biosensors

Biosensors are the short of 'Biological Sensors'. The concept of biosensor was first introduced in 1960 and in 1962 Leland C. Clark presented the model of biosensor with the help of enzyme electrodes. It consists of two main parts: Bioreceptor and Transducer. Transducer is main key component of Biosensor. It makes use of a physical change accompanying the reaction. Biosensors utilize biological molecules or living organism to identify chemicals. Generalworkingprincipleofabiosensorisshown in the fig. 1



Several newly developed techniques ranging from electrochemical, optical including fluorescence-based, and electromechanical are modern transducing methods, which are widely utilized in the development of biosensors [7]. It is easily available and with low cost.

Biosensors and Food Industry

The food industry has a general need for methods which are simple, rapid, inexpensive, readily available, stable reagents and are ideally automated [8]. Biosensor Technology in Food Industry offers a new and rapid type of monitoring and measuring device. Electrochemical biosensors allow for the measurement of at least 90 substances like Amino Acid, Gases, Cofactors, Carboxylic Acid, Antibiotics, Sugar, Starch, Alcohol, Phenols, and Vitamins etc. [9]. Biosensors can be used in Wine, Beer, Yogurt and soft drink producer Industries. Immune-sensors have important potential in ensuring food safety by detecting pathogenic organism in fresh meat, poultry or fish. [10].

Food Packaging

Biosensors and its potential applications are an emerging technology in food packaging. This Technology may be used to enhance the safety and quality of food product in packaging system.The main functioning of sensors in packaging is to maintain the hygiene of the surrounding, product status, data exchange with the external database providing information for decision making of the food stuff [11]. Biosensors are used in the direct and indirect detection of pathogens of food stuffs [12].

The Heavy Metals

Biosensors are used for detecting heavy metals such as: lead, mercury and cadmium down to the EPA limit for these metals in drinking water, food packaging samples such as rice bags and other food products. [13].

Agrochemicals of Food

Numerous pesticides are used in the field to protect the crop and to increase the yield. These pesticides and chemicals can be detected by the biosensors and food quality [14].

Unpermitted Chemicals and Nutrients in Food

Unpermitted chemicals are often added in milk or milk products. This contaminated milk can be studied with the help of biosensors [15, 16]. Nutrients of food and chemicals in food products can be detected with the help of biosensors. [17].

Food processing

Process control in the food industry is more difficult than in other industries due to the utilization of more complex and variable raw materials having measured parameters which are often difficult to define [18].

Conclusion

Several different types of biosensor are used in food industry. Food hygiene, processing, safety, purity can be easy and cheaper with the use of biosensors. This article focused on different types of biosensors in food industry. Each biosensor has its own applications, characteristics, advantages and disadvantagein terms of the equipment required, sensitivity, simplicity and cost-effectiveness. Use Biosensors in food industry in a simple effective technique.

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