OPEN ACCESS Freely available online

ISSN: 2157-7110
Journal of Food Processing & Technology

Perspective

Authentication Nanoenzyme for Food Safety Analysis and their Challenges

Marie Singh*

Department of Food Safety, Aristotle University, Thessaloniki, Greece

DESCRIPTION

Food safety concerns affect people's livelihoods and the global economy, and they are a major public concern on both sides of the globe. Biological risks, unlawful additions, pesticide residues, heavy metals, and other substances are examples of food contaminants that can infiltrate food items during production and distribution. The crucial first line of defense in this situation to ensure food safety is food safety analysis. The World Health Organization has thus created and put into effect laws and regulations to safeguard people from the dangers and hazards to their health brought on by food contamination. Despite having a lot of practical experience building testing methods and management systems, the threat to food safety that is concealed from sight still persists and is difficult to eliminate completely. There are now certain established methods for assessing food safety, such as gas chromatography, high-performance liquid chromatography, liquid chromatography with mass spectrometry, etc. However, the complexity, length of time, and technical expertise needed for these approaches restrict their widespread use in practical analysis. The complexity of the trace level of food contaminants is projected to need the development of innovative, quick, and accurate analytical procedures.

It has been extensively investigated to build biosensors for food safety analysis using natural enzymes as ubiquitous biocatalysts. However, numerous inherent disadvantages, such as a flimsy construction, difficult working conditions, and costly preparatory costs, severely restrict their applicability. Nanozymes are characterised as nanomaterials having inherent enzyme-like activity that share traits with both traditional manufactured and natural enzymes. The advantages of nanozymes over traditional enzymes are their superior cheap cost, easy manufacturing, high stability, and powerful catalytic activity. Different nanomaterials with distinct physicochemical properties have been found to have similar catalytic performance to native enzymes as materials science and nanotechnology advance, which has attracted significant interest in the fields of sensing and biosensing, medicine, agriculture, disease treatment, and other areas. Nanoenzyme-based biosensors for convenient and accurate analysis of food contaminants demonstrate great merits over conventional sensing techniques based on native enzymes, including high sensitivity and selectivity, more precise target recognition, shorter detection times, and better signals.

Nanozymes for food safety analysis

The interdisciplinary qualities of both enzymes and nanomaterials are present in nanozymes, which are described as nanomaterials having enzymatic catalytic activities. One example is that nanozymes may develop biocatalytic platforms even in severe environments, replacing and even outperforming the activity of natural enzymes. Another example is the signal amplification achieved by combining functional nanozymes with the hereditary photo-electro-magnetic effect with electrochemical, fluorescence, colorimetric, and photoelectrochemical methods. Nanozymes have been widely employed to build biosensors for the monitoring of food quality and safety because to their great capabilities and a variety of analytical techniques. According to the categories of targets, the most recent developments in the sensitive detection of food contaminants are primarily categorized into four types in this section: biological risks, heavy metal ions, antibiotics, and pesticide residues.

Challenges

- Increasing the sensitivity of food safety analyses based on nanozymes. An ongoing issue is the inadequate sensitivity of nanozyme-based sensing systems, which is directly tied to the catalytic activity of nanozymes. One of the technological roadblocks that have to be cleared immediately relates to further adjusting nanozymes to increase their catalytic activity, which is still significantly lower than that of natural enzyme.
- Investigating in to the toxicity a significant challenge in the area of food safety is the toxicity of nanozymes. The cause and consequences of the toxicity of nanozymes are dependent on a number of variables and differ from type to kind. It is still necessary to carry out the comprehensive investigation of its toxicity mechanism and related treatments.

Correspondence to: Marie Singh, Department of Food Safety, Aristotle University, Thessaloniki, Greece, E-mail: mariesinghk346@gmail.com

Received: 02-Sep-2022, Manuscript No. JFPT-22-18242; **Editor assigned:** 05-Sep-2022, PreQC No. JFPT-22-18242 (PQ); **Reviewed:** 19-Sep-2022, QC No. JFPT-22-18242; **Revised:** 26-Sep-2022, Manuscript No. JFPT-22-18242 (R); **Published:** 03-Oct-2022, DOI: 10.35248/2157-7110.22.13.954

Citation: Singh M (2022) Authentication Nanoenzyme for Food Safety Analysis and their Challenges. J Food Process Technol.13:954