Shivendu Ranjan
Nandita Dasgupta
Eric Lichtfouse *Editors*

Nanoscience in Food and Agriculture 1

Editors
Vineet Kumar
Lovely Professional University
Jalandhar, Punjab, India

Shivendu Ranjan
Faculty of Engineering and the Built
Environment
University of Johannesburg
Johannesburg, South Africa

Eric Lichtfouse
Aix Marseille University, CNRS, IRD,
INRA, Coll France, CEREGE
Aix en Provence, France

Praveen Guleria
Plant Biotech and Genetic Engineering
Labarotory
DAV University, Department of
Biotechnology
Jalandhar, Punjab, India

Nandita Dasgupta
Department of Biotechnology
Institute of Engineering and Technology
Lucknow, Uttar Pradesh, India

ISS

Contents

Chapter 2
Nanosensors for the Detection of Chemical Food Adulterants

Namita Ashish Singh, Nitish Rai, and Avinash Marwal

Abstract Food adulteration is a major problem all across the globe and needs to be handled with the highest priority. Growing awareness about food safety and quality leads to the development of tools and techniques for the detection of food adulterants. With the advent of nanotechnology, it is now possible to detect the food adulterants using nanomaterials with enhanced sensitivity and low detection limits. In this chapter, several chemical food adulterants with their worldwide adulteration incidences and hazardous effect on human life have been discussed. Further, for each adulterant, novel nanosensors are described for their detection in various food samples along with the detection limit and mode of action. It was found that several major food adulterants exist like preservatives, melamine, urea, antibiotics, synthetic food dyes, dioxins, sucrose, starch, etc. Some of them possess a hazardous effect on human health. Several kinds of nanosensors exist for their detection in a variety of food samples like beverages, fish, vegetables, namkeen, sauces, milk, and milk products. Though the area of nanosensors based detection of food adulterants is growing swiftly, it has a long way to go since there are many adulterants for which no nanosensors are available. So, further research studies are needed to develop nanosensors for common food adulterants and explore the possibility of designing the novel nanosensors that could improve the detection sensitivity and specificity of the existing ones. With a tool as powerful as nanosensors, we will be better equipped to combat future scenarios of adulteration scandals.

Keywords Adulterants · Chemicals · Incidence · Nanosensors · Food safety

N. A. Singh
Department of Microbiology, Mohanlal Sukhadia University, Udaipur, Rajasthan, India

N. Rai (✉) · A. Marwal
Department of Biotechnology, Mohanlal Sukhadia University, Udaipur, Rajasthan, India
e-mail: nitish.rai@mlsu.ac.in