

Sustainable Agriculture Reviews 20

Shivendu Ranjan  
Nandita Dasgupta  
Eric Lichtfouse *Editors*

# Nanoscience in Food and Agriculture

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 Springer

*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  
Laboratory  
DAV University, Department of  
Biotechnology  
Jalandhar, Punjab, India

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

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## 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

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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.raai@mlsu.ac.in