

*Food Biology Series*

# Food Traceability and Authenticity Analytical Techniques

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# Preface to the Series

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Food is the essential source of nutrients (such as carbohydrates, proteins, fats, vitamins, and minerals) for all living organisms to sustain life. A large part of daily human efforts is concentrated on food production, processing, packaging and marketing, product development, preservation, storage, and ensuring food safety and quality. It is obvious therefore, our food supply chain can contain microorganisms that interact with the food, thereby interfering in the ecology of food substrates. The microbe-food interaction can be mostly beneficial (as in the case of many fermented foods such as cheese, butter, sausage, etc.) or in some cases, it is detrimental (spoilage of food, mycotoxin, etc.). The *Food Biology* series aims at bringing all these aspects of microbe-food interactions in form of topical volumes, covering food microbiology, food mycology, biochemistry, microbial ecology, food biotechnology and bio-processing, new food product developments with microbial interventions, food nutrification with nutraceuticals, food authenticity, food origin traceability, and food science and technology. Special emphasis is laid on new molecular techniques relevant to food biology research or to monitoring and assessing food safety and quality, multiple hurdle food preservation techniques, as well as new interventions in biotechnological applications in food processing and development.

The series is broadly broken up into food fermentation, food safety and hygiene, food authenticity and traceability, microbial interventions in food bio-processing and food additive development, sensory science, molecular diagnostic methods in detecting food borne pathogens and food policy, etc. Leading international authorities with background in academia, research, industry and government have been drawn into the series either as authors or as editors. The series will be a useful reference resource base in food microbiology, biochemistry, biotechnology, food science and technology for researchers, teachers, students and food science and technology practitioners.

**Ramesh C. Ray**  
*Series Editor*

# Preface

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The word 'Traceability' is formed etymologically from the verb 'trace' which is derived from the Latin: *tractiare* (to drag) and *tractus*, past participle of *trahere* (to pull). It refers to track or trail, to follow or study in detail or step by step (Merriam Webster Dictionary 2003).

Historically, traceability was used to get a better flow of the matters inside enterprises with the objectives to save time and money. Traceability became a legal tool in 2005 in Europe that is applied to all food stuffs that are tradable with the objective to assure their food safety (Article 18, UE regulation 178/2002) and giving food safety responsibility to all business operators (Article 19).

Actually, the word 'traceability' is employed to describe a system that permits to document the history of a product along its entire production chain from primary raw materials to the final consumable products (MacDaniel and Sheridan 2001). It has to be noticed that the sentence "ability to trace" is used in ISO standard, "ability to follow" in Codex standard, while "ability to trace and follow" is used by the EU. In USA, they use "the creation and maintenance of records".

Food traceability also became a growing consumers' concern worldwide. Traceability is undertaken primarily at the administrative level, and the use of advanced analytical tools is emerging. Currently, there is no analytical method available that permits the efficient determination of foodstuff origin or that allows to trace food during international trade. Nevertheless, the determination of geographical origin is a demand of the traceability system for the import and export of foodstuffs (UE regulation 178/2002).

The book highlights all aspects of food traceability through many angles: the history of traceability, legislations and rules, the actual traceability techniques, and the potential analytical techniques for food traceability; these topics are hotspots of contemporary food science research. Analytical techniques for food traceability include molecular methods (e.g., DGGE, SSCP), next generation sequencers (NGS), bio-captors, chromatographic techniques that are used for discrimination of organic food, fish, oils and meats. The chromatographic techniques help in the use of volatile compounds analysis. Ambient mass spectrometry is used for studying

mycotoxins and alkaloids in foodstuffs and their management, food and feed authentication in olive and other plant oils, and wine. Vibrational methods (e.g., NMR and NIRS) are used to trace food by global spectrum. States of art of the actual and future techniques including metabolomic techniques and probes are discussed.

**Didier Montet**  
**Ramesh C. Ray**

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