Spectroscopy and nonlinear algorithms: A promising tool in the field of food technology

The measurement of the interaction between foods and electromagnetic radiation provide relevant information. In most cases, absorption and/or emission of the compounds present in food useful offer data regarding their quality, degradation rate, nutrients, and so on. Logically, this information is compelling for food companies, administration, and, what is most important, consumers. Undoubtedly, the main problem of extracting this knowledge from the food is the complexity of the spectroscopic signals. In some cases, this problem can be overcome using classical algorithms. Nevertheless, there are real situations where the signals are hidden or overlapped resulting in a spectrum which cannot be interpreted as easily. In these cases, more sophisticated algorithms are required. Nonlinear algorithms based on artificial neural networks and chaotic parameters have been tested for a wide range of foods and applications. These algorithms have led to the design of successful tools which robust results in other fields such as health, chemical engineering, analytical chemistry, and so on. In the food technology field, spectroscopic approaches as absorption and fluorescence have been implemented using an UV–vis spectrophotometer and light-emitting diodes (LEDs), respectively. These methodologies have been combined with the mentioned algorithms. This approach was tested to characterize different kinds of similar foods, determine their quality, and detect, identify, and quantify adulterations of extra virgin olive oil, vinegar, tomatoes, and honeys. These intelligent algorithms have given better results than other classic models, and their subsequent applications are providing promising results that are going to be implemented in a higher scale.

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Biography

Jose S Torrecilla is a Professor of the Chemical Engineering Department of the Complutense University of Madrid (UCM). He has completed PhD with Honors in Chemical Engineering from UCM in 2000. He obtained Advanced Technician in Occupational Risk Prevention and Integrated Management Degrees in 2005. In 2017, he got his MBA degree with honors. Modeling complex systems for many fields such as Health, Chemistry, and Food Technology is his main line of research, which is done in collaborations at national and international levels.