Quality of food investigated by optical techniques

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The determination of food authenticity and quality are a crucial issue for food quality and safety. Food quality includes factors as size, shape, colour, gloss, and consistency, texture, flavour; federal grade standards as well as chemical, physical and microbial properties. Among the possible physical techniques, optical spectroscopy is interesting since provides rapid chemical and physical profiling of food and could become an effective tool for authentication when coupled to chemometrics. The mentioned techniques are nondestructive and can be used remotely. In the present work a selection is presented of spectroscopic techniques tested for guaranteeing the quality and safety of typical foods, such as extra virgin olive oil, dairy products (milk, cheese and whey), and coffee. Techniques such as fluorescence, lifetime, Raman scattering, thermal lens, infrared spectroscopy (Near Infrared and Mid Infrared) will be investigated. We will also show how food can be characterized by their spectral profiles and the use of statistical tools, due to their natural variability. The topic of frauds will be also commented, especially in milk products, and some common frauds will be mentioned. We will emphasize how optics can be used to detect and quantify the frauds. In the case of olive oil, we will focus on the fraud of olive oil will soy. Investigation of Coffee also indicates that spectroscopy can be useful to characterize the types of coffee as well as their blends. The authors would like to thank the financial support of the Brazilian agencies CAPES, CNPq, FINEP and FAPEMIG.