

# HOW STATISTICS IS IMPROVING FOOD ANALYSIS IN SOUTH-AMERICA: AN OVERVIEW OF BRAZILIAN CASES

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## Abstract

The methods of mathematics and multivariate statistics have taken a long time to be used not only in the natural sciences but also in other areas because of the lack of computational technology capable of making calculations necessary in most applications of practical interest. Nonetheless, to deal with the massive amounts of data derived from the use of different measuring devices (e.g. instrumental and sensory data), which provides a large and complex dataset in terms of sample numbers and variables, types, and responses, there is a need for tools to help on the data evaluation and allow for suitable interpretability and intervention. The use of multivariate statistical techniques developed for analytical chemistry has been widely adopted in food science and technology, generally used for authentication of geographical origin, farming systems, or even to trace adulteration of high value-added commodities. To do so, several statistical techniques have been used to develop multivariate methodologies and to extract information from techniques such as spectroscopy, spectrometry, and chromatography, in order to identify the species present and quantitatively determine the concentrations of some or all of them. The applicability of each methodology depends on the dataset (experimental information) submitted to the analysis. From the point of view of analytical chemistry these multivariate methods can generally be classified into three categories: I) when there is spectral information of all the species in the sample; II) when the information of the spectra of the chemical species are incomplete or partial; III) when there is no information on the chemical composition of the samples. Therefore, complementary disciplines and tools to the traditional ones used in food science have become essential and are an integral component in the day-to-day analysis of foods and derived products. Considering this scenario, this seminar aims to superficially expose some of the statistical methods which are being used to solve problems in food science in Brazil, specifically in the Post-Graduation Program of Food Technology of the Federal University of Technology of the Paraná.