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3rd Winter School on Chemometrics—Food Analysis Applications

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The 3rd Winter School on Chemometrics (EIQ 2017) organized by professors Fabíola Manhas Verbi Pereira, Renato Lajarim Carneiro, and Edenir Rodrigues Pereira-Filho was held at the Institute of Chemistry, São Paulo State University (IQ-CAr/Unesp, Araraquara, São Paulo State, Brazil), in July 24–26, 2017. The third edition repeated the success of the two previously organized in 2013 (Federal University of São Carlos, São Carlos, São Paulo State, Brazil) and in 2015 (Campinas State University, Campinas, São Paulo State, Brazil). The main goal of EIQ 2017 was to bring together experts in the field of chemometrics, promoting an exchange of ideas among participants, instigating discussions on the dissemination of mathematical-statistical methods in data related to chemical and food applications and update the use of new chemometric tools. More than 150 students and professionals from 13 Brazilian states and 3 countries (Argentina, Peru, and France) attended the school. Figure 1 shows an image from all participants.

The final program was composed by 6 lectures about diverse subjects, 6 short-courses with specialists from Brazil, Belgium, and the USA and 79 abstracts were discussed in poster and oral presentation sections. All goals were achieved and this Special Issue of Food Analytical Methods dedicated to EIQ 2017 shows some topics that encompass chemometrics and food analytical methods development.

This Special Issue reflects the interaction between chemometrics and analytical methods involving food analysis. Several chemometric strategies were applied in different food matrices. Digital images, for instance, was used for physical parameters evaluation in corn grains combined with regression models, and also for fast identification of açai adulteration, a broadly consumed natural food from the Amazon jungle. Spectroscopy techniques as infrared, near infrared, mid infrared, UV-Vis, and Raman were used for macadamia cultivars classification, discrimination of milk contaminated with *Salmonella* sp., determination of purity of copaiba and coconut oils, monitoring of oxidative stability in olive, vegetable and andiroba oils, determination of total sugars in soy beverages, determination of total phenolic compounds and antioxidant activity of ethanolic extracts of propolis, and discrimination of honey from several provenances. It is well-known that nuclear magnetic resonance (NMR) has a great potential for chemical analysis, and it was applied for obtaining fingerprint for coffee. NMR was also compared with infrared techniques for quality control of jams. One of the main characteristic of chemometrics is to use information from several types of instrumental methods. This ability is also present in this Special Issue with the use of images obtained with a mobile phone to study thermal stability of milk and determination of ethanol in sugarcane spirit. Factorial design was employed by several researchers in order to optimize experimental conditions. When factorial design was combined with sample preparation, valuable information was obtained with just few experiments. This property was exploited to optimize an ultrasound-assisted extraction method for metals determination in tea samples. Physico-chemical properties and chemometrics were used for identification of milk adulteration. Principal component analysis (PCA) is the most successful chemometric tool for data set decomposition and exploratory analysis, and it was used for investigation of adulteration of Yerba mate. Voltammetry has a great potential for chemometric applications, and this combination was exploited to propose a voltammetric e-tongue method for classification of teas. Laser-induced breakdown spectroscopy (LIBS) is an emerging analytical technique characterized by minimal sample preparation, possibility to perform direct solid analysis and

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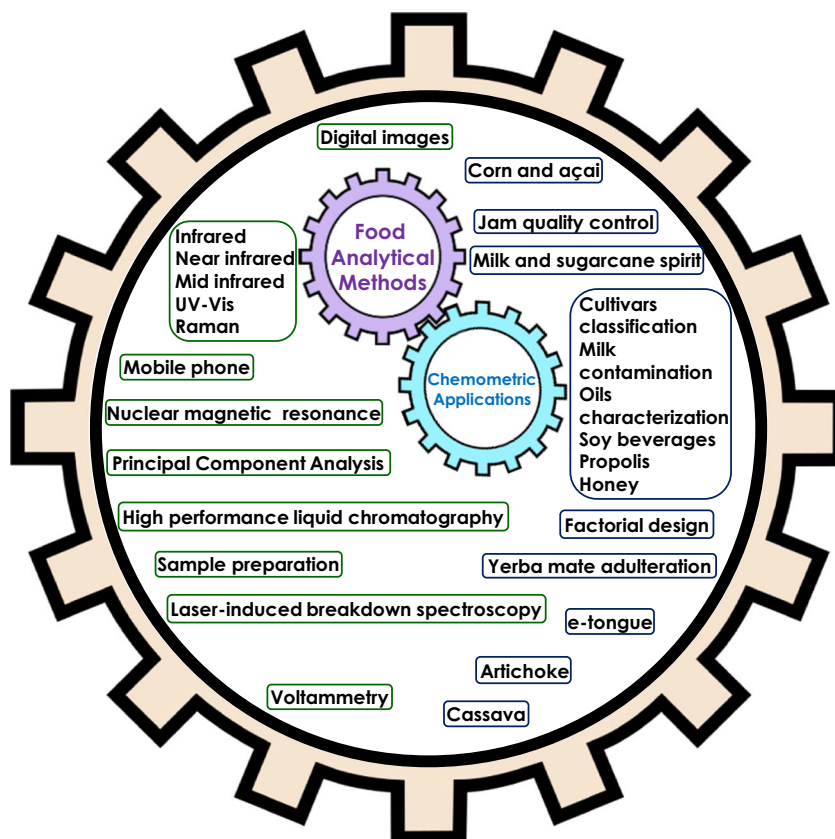**Fig. 1** EIQ 2017 official photo with all participants

high analytical frequency. LIBS associated with signal normalization or standardization protocols was used to direct determination of Ca, K, and Mg in cassava flour samples. High-performance liquid chromatography (HPLC) is also a topic present in this Special Issue for artichoke fingerprint proposition. Figure 2 shows a pictorial description of all articles topics published in this Special Issue.

The final output is extremely positive and it is clear that once again chemometric strategies demonstrated and increased its potential to act on relevant applications in

Fig. 2 Pictorial description of analytical applications synergically combined with chemometrics

Compliance with ethical standards

Conflict of Interest Fabíola Manhas Verbi Pereira declares that she has no conflict of interest. Edenir Rodrigues Pereira-Filho declares that he has no conflict of interest.