CHEMOMETRIC METHODS USED TO EVALUATE THE QUALITY OF FOOD PRODUCTS AND THE EFFICIENCY OF EXTRACTION OF BIOACTIVE COMPOUNDS FROM PLANTS

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Abstract

In accordance with the title, the doctoral thesis aimed at assessing the quality of food products and the efficiency of extraction of bioactive compounds from plants using chemometric methods.

The thesis is structured in 2 main parts, *i.e.*, **1. CRITICAL STUDY OF LITERATURE DATA**, containing relevant information from the literature regarding chemometric methods, assessment of honey quality, and extraction of bioactive compounds from edible plants, and **2. ORIGINAL CONTRIBUTIONS**, in which the results obtained by the author are presented.

In chapter **2.1. Characterization and classification of Romanian acacia honey based on physicochemical parameters and chemometrics**, the results of the physicochemical analysis for samples of pure acacia honey (P), indirectly adulterated honey (I), obtained by feeding bees with 3 different industrial syrups, and directly adulterated honey (D), prepared by mixing P honey with the same syrups, are presented. The study aimed at measuring the relevant physicochemical parameters of the honey samples and to discriminate pure from adulterated honey based on these parameters, using PCA (Principal Component Analysis) and LDA (Linear Discriminant Analysis) as chemometric tools. The contents of moisture, ash, 5-hydroxymethylfurfural (HMF), reducing sugars and sucrose, free acidity, diastase activity, and $\Delta\delta^{13}C = \delta^{13}C_H - \delta^{13}C_P$ were the physicochemical parameters considered in the multivariate analysis.

Chapter **2.2. The effect of the extraction solvent on the composition and antioxidant activity of edible flower extracts** is structured in 2 subchapters, one referring to the extracts obtained from the aerial parts of chicory (*C. intybus*), basil (*O. basilicum*), and sage (*S. officinalis*) plants, the other to the extracts obtained from the flowers of cornflower (*C. cyanus*), pot marigold (*C. officinalis*), hibiscus (*H. sabdariffa*), and chamomile (*M. chamomilla*). The extracts were obtained by maceration with agitation, using ethanol, methanol, and two mixtures of ethanol and methanol (containing 40% and 60% ethanol) as extraction solvents. The total polyphenol content (TPC), total flavonoid content (TFC), and percentage inhibition (PI) of the extracts were the variables selected as responses of the extraction process. The experimental data were processed using PCA and one-way ANOVA.

The general conclusions of the thesis and some research perspectives are presented in chapter **3**.