

DETERMINATION OF GEOGRAPHICAL ORIGIN OF BLACK LOCUST HONEY OF FIVE CROATIAN REGIONS BY APPLYING THE PCA METHOD

Natalija Uršulin-Trstenjak^{1*}, Davor Levanić¹, Saša Šušnić², Dario Lasić³, Vesna Šušnić⁴

¹University North, 104 brigade 3, 42000 Varaždin, Croatia

²ŠUŠNIĆ d.o.o., M. Barača 19, 51000 Rijeka, Croatia

³Andrija Štampar - Teaching Institute of Public Health, Mirogojska 16, 10000 Zagreb, Croatia

⁴Teaching Institute of Public Health, Primorsko-Goranska County, Krešimirova 52a, 51000 Rijeka, Croatia

*e-mail: natalija.ursulin-trstenjak@unin.hr

Abstract

The composition of honey depends on the plant species, climate conditions, environmental conditions, and good beekeeping practice. Honey mainly consists of: carbohydrates, water, proteins, free amino acids, enzymes, vitamins and minerals, flavorings and fragrances, and the phenol compounds alongside 200 other compounds. During the process of honey labelling, the product name may be supplemented with information referring product origin.

In order to determine the geographical origin of honey, a variety of analytical techniques and control parameters in combination with statistical techniques are used. Therefore, the purpose of this paper is to describe the application of the statistical method of Principal Component Analysis - PCA to determine the geographical origin of honey for five Croatian regions (Varaždin, Krapina-Zagorje, Bjelovar-Bilogora, Eastern Croatia and Istria) based on the defined share of micro and macro elements and physicochemical parameters obtained from 200 samples during two seasons. Upon conducting the melissopalynological analysis to confirm the botanical origin of honey declared by the manufacturer, the congruence of physicochemical parameters (electrical conductivity, free acids, diastase activity, water content, reducing sugars, sucrose and HMF) has been checked with literature data and the requirements of regulations. Twelve elements (Ca, Na, K, Mg, Zn, Fe, Cu, Mn, Al, Ni, Pb and Cd) have been determined and compared with literature data.

Obtained results have been used in the application of PCA method for determining the geographical origin of honey for five Croatian regions. The graphic overview is made for the first two factors, where each variable is shown by the current combination of factors: the projection of the physicochemical parameters and macro and micro elements.

As conclusion after the PCA analysis we could talk about the characteristic parameters: electrical conductivity, free acids, water and sucrose, as well as the share of Al, K, Fe, but only Cu could characterize the region of east Croatia, season I.

Key words: Honey, Geographical origin, PCA.