CONTAMINATION OF ENVIRONMENT OF HEAVY METALS: HONEY AS A SENSITIVE INDICATOR

ANNAMARIA PERNA[1]*, IMMACOLATA INTAGLIETTA[1], AMALIA SIMONETTI[1], SANDRA MEDICI[2], JUAN MARIOLI[3], GABRIEL SARLO[3], GUSTAVO VELIS[3], MARTIN EGUARAS[3], EMILIO GAMBACORTA[1]

[1]*Università degli Studi della Basilicata, Potenza, 85100, Italia*
[2]*CONICET, Buenos Aires, 1426, Argentina* [3]*Universidad Nacional de Rio Cuarto, Rio Cuarto, 5800, Argentina*
[3]*Universidad Nacional de Mar del Plata, Mar del Plata, 7600, Argentina*
anna.perna@unibas.it

Honey is a quick, safe and natural energy giver because its simple sugar is quickly absorbed into the blood stream, honey is an easily digestible foodstuff containing a range of nutritiously important complementary elements. Besides a high content of a range of saccharides, there are also organic acids, amino acids, mineral matters, colors, aromatic substances and a trace amount of fats.The contribution of minerals is relatively low and normally accounts for 0.1 – 0.2 % of nectar honeys. Analysis of honey for trace elements content is necessary in food quality control as well in the monitoring of the bee environment. The goal of this preliminary study was mainly to evaluate the effectiveness of honeys as biological indicator and in particular, this work gives increasing attention to specific mineral elements as Cd, Pb, Cr and As, expression of environmental pollution. Cd, Pb, Cr and As were determined by using Atomic Absorption Spectrometry in seventy-eight honey samples from nine geographical areas all over Southern Italy and from five different botanical origins: chestnut (Castanea sativa), sulla (Hedysarum spp.), multifloral, citrus (Citrus spp.), and eucalyptus (Eucalyptus spp.). The data collected were subjected to analysis of variance (ANOVA). The results show that our samples did not have traces of As as The concentration was below detection limits. The levels of Cr ranged between 0.32 and 1.02 ppm, with a mean value of 0.71 ppm, In particular, honey from areas 2, 3 and 7 presented the significantly higher average value. The average content of Cd in honeys from the areas studied was of 0.013 ppm. The average level of Pb in the our campioni è stato pari a 0.3 ppm. Honeys from area 2 presented the highest content of Pb (0.90 ppm, $P<0.05$), followed by honeys from areas 7 and 1 have presented values of Pb of 0.34 and 0.33 ppm, respectively ($P<0.05$), while in the other areas this element has showed value lowest, <0.17 ppm. These production areas are characterized by high anthropogenic presence and industrialization. The concentrations of heavy metals in honey and the variability due to differences in such factors as floral source, foraging range, entrapment of atmospheric aerosols by flowers, season and time of year, rainfall, etc., and the easy availability of honey make it a sensitive indicator of the environmental pollution.

Keywords: honey, heavy metal