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**PESTICIDE RESIDUES AND HEAVY METALS IN COMMERCIALY  
PROCESSED PROPOLIS**

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**ABSTRACT**

The results of the present work show the presence of heavy mineral elements, such as Cr, Ni, Cu, Zn and Pb, and pesticide residues like fungicides, herbicides and acaricides in thirty-one commercially processed propolis capsules, tablets, tinctures, candies and syrups originating from Spain, Portugal, Belgium, England, USA and Chile. The determination of the mineral composition of propolis was carried out using Inductively Coupled Plasma Mass Spectrometry (ICP-MS), and contained Cr (0.10-17.7 ppm), Ni (0.01-7.01 ppm), Cu (0.01-6.44 ppm), Zn (0.01-6.44 ppm) and Pb (0.03-7.21 ppm). The pesticides were quantified using Gas Chromatography-Mass Spectrometry (GC-MS), where triadimefon was the main pesticide detected and quantified (between 0.32-2.68 mg/kg) and was present in 65% of the samples. The other pesticides found to be present, but to a lesser extent, were quinterozone (0.91-1.06 mg/kg), procymidone (0.11 mg/kg), metazachlor (0.63-6.09 mg/kg), folpet (up to 11.31 mg/kg), dichlofluanid (up to 0.29 mg/kg) and chlorfenson (1.05 mg/kg).

Keywords: processed propolis, heavy metals, pesticides.

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