



### *Antioxidant Activities of Propolis from Aragón (Spain)*

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#### Abstract

Propolis has demonstrated a strong antioxidant activity<sup>1</sup>. This property, together with other compositional parameters<sup>2</sup> could contribute to the difficult standardization of propolis. Antioxidant activity should be determined by methods based on different mechanisms, and against several free radicals<sup>3</sup>. The purpose of this research was to help characterize propolis from Aragón (Spain) by determining the oxygen radical absorbance capacity (ORAC)<sup>4</sup>, trolox equivalent antioxidant capacity (TEAC)<sup>5</sup>, 2,2-diphenyl-1-picrylhydrazyl (DPPH) assay<sup>6</sup>, as well as the radical-scavenging effect on hydroxyl radicals (AOA)<sup>5</sup> on hydroalcoholic extracts of eight Aragonese propolis samples. Propolis extracts were obtained with 70% (V/V) ethanol. All extracts showed high antioxidant activities. The following averages were obtained: For ORAC 11070 µmol trolox/g, for TEAC 1040.7 µmol trolox/g, for IC<sub>50</sub> DPPH 0.0698 mg/ml and for AOA 0.8783 mmol uric acid/g. At the 95.0% confidence level, significant linear correlations were found between ORAC and TEAC (r= 0.9436), ORAC and AOA (r= 0.9142) and TEAC and AOA (r= 0.9919) and a double reciprocal correlation between TEAC and DPPH (r= 0.7403). The lack of correlation between ORAC and AOA with DPPH results is likely due to the fact that the antioxidant compounds of Aragonese propolis could react very fast with both peroxy (ORAC assay) and hydroxyl (AOA assay) radicals, and at a slow pace to DPPH due to steric inaccessibility<sup>3</sup>. Nevertheless, further studies are necessary to corroborate this conclusion.

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