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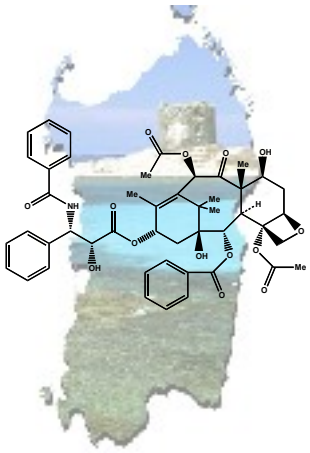

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IDENTIFICATION AND QUANTIFICATION OF ANTIOXIDANT COMPOUNDS AND EVALUATION OF CORRELATED PHYSICAL-CHEMICAL FEATURES OF HONEY FROM VARIOUS FLORAL SOURCES

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In the past several years, there has been increasing evidence of the antioxidant properties of honey, particularly due to the presence of flavonoid compounds, phenolic acids, enzymes (e.g. glucose oxidase, catalase), ascorbic acid, degradation products, amino acids and proteins[1]. The phenolic compounds contained in honey contribute significantly in reducing oxidative reactions within the food systems (e.g. lipid oxidation in meat and enzymatic browning in fruits and vegetables)[2] and human health[3]. Recently studies showed that there is a strong correlation between the antioxidant capacity of honey and the total phenolic acids' content[1] and correlation between the antioxidant activity and honey colour [4]. However, the antioxidant capacity varies greatly depending on the honey floral source; it is possibly due to the differences in content of plant secondary metabolites and enzyme activity[4].

The objective of this study was to identify and quantify, by HPLC analysis, the polyphenolic fraction of honey from 10 various floral sources to evaluate a probable correlation between the content of antioxidant compounds, antioxidant activity (FRAP test and DPPH test) and physical-chemical features (colour and electric conductivity). Thus 51 unifloral honey samples, collected in different Sardinia areas, were examined: asphodel, cardoon, chestnut, cistus, strawberry-tree, eucalyptus, lavender, myrtle, rosemary and thyme honey.

Results show that the honey phenolic compounds concentration varies according to the floral origin, ranging from 5.8 mg/100g of asphodel honey to 96.0 mg/100 g of strawberry-tree honey. Some compounds such as apigenin, galangin, pinocembrin and pinobanksin are always presents in all different examined samples. In fact, these flavonoids generally originate from propolis and are distributed between the lipophilic beeswax and the more hydrophilic honey[5]. Besides, typical substances are present in moderate quantities in the honey regard to the floral sources: for example kampferol was found in strawberry-tree honey (1.06 mg/100g) and eucalyptus honey (0.94), while luteolin in strawberry-tree honey (0.96) and syringic acid in chestnut honey (1.13).

The chlorogenic acid is representative of thyme honey (0.35) and lavender honey (0.10). Catechin was found in the myrtle (0.25) and rosemary (0.21) honey.

As far as the antioxidant activity of the polyphenol extract fractions is concerning, the strawberry-tree honey extracts show the highest activity (50.5 mg/100g of trolox equivalents), which is 10 folds higher than those of other extracts; while the extract of asphodel honey results the less active (3,8 mg/100g).

The statistical analysis points out a good correlation between total phenolic concentration and antioxidant capacity obtained by DPPH test ($r=0.911$, $p<0.001$) and FRAP test ($r=0.926$, $p<0.001$), and also between electric conductivity and honey colour ($r=0.605$, $p<0.001$) while no correlation was found between total phenolic content and honey colour. In fact many different factors can contribute to the honey colour such as mineral salts, organic acids, proteins, polyphenols and brownish compounds due to the alteration processes (e.g. HMF)[6].

In conclusion, colour, polyphenol contents and electric conductivity show great variability also depending from the different floral origin of honey.

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