UNIVERSITÀ DELLA CALABRIA



# ANTIOXIDANT ACTIVITY OF EXTRACTS FROM SYBARIS LICORICE ROOTS

Marisa Carchedi<sup>a</sup>, Alessia Fazio<sup>b</sup>, Bartolo Gabriele<sup>b</sup>, Pierluigi Plastina<sup>b</sup>

<sup>a</sup> Department of Chemistry, University of Calabria, Rende (CS), Italy <u>mars\_84@libero.it</u>
<sup>b</sup> Department of Pharmaceutical Sciences, University of Calabria, Rende (CS), Italy

#### Introduction

Licorice has been known and used for more than three thousand of years and has found its ideal habitat in the Sybaris Plain (Calabria, Italy). Licorice plants grow spontaneously in Calabria where the type of soil and the climate help to increase the glycyrrhizine content.

According to the Encyclopedia Britannica it seems that Calabria's licorice is the best in the world for the quality and yield. In particular, its sweet flavor is used to make liqueur, grappa, chocolate, torroncini (type of nougat), soft sweets, syrups and lastly, eau-de-Cologne and licorice shampoo-shower gel.

Neverthless, no information regarding the antioxidant properties of licorice root extracts from spontaneous plants in Sybaris has been reported so far.

The aim of the present study was to examine the antioxidant properties of the extracts from the dried roots of licorice (*Glycyrrihza Glabra*) provided by the Sybaris company of Vincenzo Romano.

## **Experimental Part**

The roots, chopped into small pieces (*ca.* 5 cm long), were manually decorticated. The resulting white root and the brown cortex were separately milled with an electric grinder.

The white and brown root powders were extracted by using a Soxhlet apparatus<sup>1</sup> with the following solvents: hexane, Et<sub>2</sub>O, AcOEt, MeOH, BuOH and then EtOH (20%).

According to the literature, the hexane extract contains neutral and polar lipids, but the composition of these lipid fractions is beyond the scope of the present study. All the other extracts were analyzed for their free radical scavenging activity by evaluating the colorimetric decrease in absorbance of 2,2'diphenyl-1-picrylhydrazyl (DPPH)<sup>2,3</sup> and the results were given as dose-response curves. The total phenolic content of all extracts was evalueted by using the Folin-Ciocalteau method. Gallic acid was used for calibration. Results were expressed as mg of gallic acid equivalents (GAE) per 100 g of licorice on dry weight basis.

		GAE /100g DM	CORTEX
		5,8	Et <sub>2</sub> O extract
GAE /100g	INTERNAL PART	0,35	AcOEt extract
0,473	Et <sub>2</sub> O extract	1,79	MeOH extract
0,77	AcOEt extract	0,05	BuOH extract
1,92	MeOH extract	0,48	EtOH (20%) extract
1,53	BuOH extract		
ct 2,96	EtOH (20%) extract		

### **Results and discussion**

In all cases, the values of the radical scavenging activity of the different extracts increased with the concentration. It is particularly interesting to note that brown cortex extracts, at concentration of 20 mg/mL, showed higher antioxidant activity than those from white roots. The values of radical scavenging activity of cortex extracts varied from 90% to 98% in the case of Et<sub>2</sub>O, from 86% to 90% in the case of AcOEt, from 67% to 92% in the case of MeOH and from 83% to 97% in the case of BuOH. The values of radical scavenging activity of white root extracts, at concentration of 20 mg/mL varied from 75% to 86% in the case of Et<sub>2</sub>O, from 5% to 15% in the case of AcOEt, from 28% to 81% in the case of MeOH and from 77% to 89% in the case of BuOH. The antioxidant BHA was used as positive control and displayed radical scavenging activity from 89% to 98%. By using the Folin-Ciocalteau reagent<sup>4</sup>, we observed that the white root extracts are richest in phenolic compounds. In particular MeOH, BuOH and EtOH (20%) extracts from the white roots showed the highest total phenolic content. In the case of cortex extracts only the Et<sub>2</sub>O and MeOH extracts have the highest phenolic content.



## References <sup>1</sup> Shul'ts, E. E.; Petrova, T. N.; Shakirov, M. M.; Chernyak, E. I.; Tolstikov, G. A.; *Chemistry of Natural Compounds*, **2000**, *36*, 362-366 <sup>2</sup> Blois, M. S., Nature **1958**, *181*, 1199–1200 <sup>3</sup> Belinky, P. A.; Avira, M.; Mahmood, S.; Vaya, J.; *Free Radical*

