

EVALUATION OF THE SAFETY PROFILE OF GLYCYRRHIZA GLABRA L. ETHANOLIC EXTRACT

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Introduction

Herbs have been used to provide health and medical solutions for more than 3000 years. Licorice (*G. glabra* L.) is among the 650 medicinal plants listed in *De Materia Medica* (1). It is one of the most commercially valuable plants globally, being used in the pharmaceutical, cosmetic and food industries, both for the therapeutic benefits as well as for the sweetening properties of the extract (2). It has a complex composition, and is especially rich in saponins (major constituents) and flavonoids (3). Thanks to the composition, it is currently used for many medical purposes, like: cough, ulcers, skin conditions, diabetes, cancer, etc. Because this wide variety of uses, it is important to make sure that the extract is safe. The increasing anthropogenic activities, have increased the metal concentrations in the environment, leading to higher and higher heavy metal levels, that may pose a health risk for the final consumer (4). That is why the safety profile of the extract is not only important, but also necessary.



Materials and Methods

The collected licorice roots were grinded, then the hydroalcoholic extract was prepared: 10gr powder + 100ml EtOH/H₂O (v/v-70/30) for ultrasonication (60 min, 500C, 40KHz). The product obtained was then filtered in vide and evaporated by Rotavapor 500C, 150rpm, pressure 250, in order to be completely dry. About 0.1 g of plant extract was treated with 5.0 mL 67% HNO₃ in high-pressure Teflon vessels DAP-60K and subjected to microwave acidic digestion in a three steps program. Metal concentrations were determined using a spectrophotometer novAA 400G, equipped with a graphite furnace, an auto sampler MPE60, and a Cookbook for all elements.

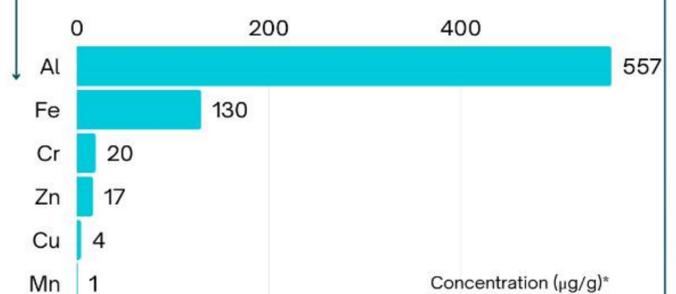
Results & discussions

The use of medicinal plants as an alternative to conventional medicine is considered by a large part of the population to be safer and less toxic to the human body (5). According to the World Health Organization (WHO), herbal medicines can be contaminated with natural and chemical contaminants, including heavy metals, which may be harmful to consumers. Trace quantities of some metal ions are essential for the living organisms, metals like copper (Cu), iron (Fe), manganese (Mn), cobalt (Co), nickel (Ni), and zinc (Zn) having a beneficial role in plant growth and development (6). Other metals, so-called "non-essential", such as lead (Pb), cadmium (Cd), arsenic (As) have no specific biological functions in an organism but they are toxic at low concentrations, persistent and accumulate through food consumption (6).

Eleven metals were determined in the ethanolic extract of *G. glabra* through atomic absorption spectroscopy. Five of them - lead, cadmium, arsenic, nickel, and cobalt - were below the detection limit. The concentration of copper (4.482±0.046), Mangan (1.029±0.030 μg/g), zinc (16.935±0.364 μg/g), and chromium (19.739±0.458 μg/g) were significantly below the permissible limit (20 μg/g for Cu, 900 μg/g for Mn, 100 μg/g for Zn, and 30 μg/g for Cr) according to the Romanian law 756/1997.



Concentration of metals* in licorice extract



The concentration of metals in plant extracts

Sample	Element concentration (μg/g)*										
	Fe	Cu	Ni	Mn	As	Al	Zn	Co	Pb	Cr	Cd
LR (Liquiritiae radix)	129.529± 7.050	4.482± 0.046	ND**	1.029± 0.030	ND	557.017± 27.781	16.935± 0.364	ND	ND	19.739± 0.458	ND

* mean of six determinations ± standard deviation.

** ND: not detected (below limit of detection)

Conclusion

In this report, we provide more information about the quality control of the licorice root (the most active part of the plant) extract. When it comes to the safety profile, there is a small amount of some metals found in the extract we analyzed, but the quantities of potentially toxic heavy metals were below the limit of detection. Therefore, from this point of view, the use of licorice extract as a therapeutic remedy can be considered safe and can be further used in investigating more uses in healthcare.

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