

HEAVY METALS CONTENT IN MEDICINAL PLANTS USED IN THE HUASTECA POTOSINA, MÉXICO.

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Introduction. Mexico has a great knowledge e in traditional medicine since ancient times. In Mexico there are over 23,400 vascular plants (1) and 5000 species are used with medicinal purposes (2). The region called Huasteca Potosina is located in the coastal plain of the Gulf of Mexico, and includes 26 from the 58 municipalities of the state of San Luis Potosi. Some surveys regarding the medicinal flora in the Huasteca Potosina have been carried out (3). However, these reports did not include quantitative analysis.

The aim of the present study was to investigate the content of Pb, Cd and Fe in plants tissue and tea infusions from leaves of medicinal plants (*Justicia spicigera*, *Hamelia patens* and *Arnica Montana*).

Methods. Plants (*Justicia spicigera*, *Hamelia patens* and *Arnica Montana*) were carefully washed using tap water followed by deionized water, and finally rinsed by immersion in a 0.01 M EDTA to remove any adsorbed metals. Plant material was dried at 70°C during 12 h and then grounded in a Wiley mill for 2 min. Analyses of Pb, Cd and Fe were carried out by acid digestion with HNO₃ and H₂O₂ (4,5). The contents of Pb, Cd and Fe in plant tissue and extracts were determined by an atomic absorption spectrophotometer (AAS) using an air-acetylene flame or graphite furnace (Varian-SpectrAA 220 FS, CA).

Results. The essential or nonessential heavy metals are considered as toxic elements for plants and human when they appear in high concentrations. Analyses of Pb, Cd and Fe in roots, stems and leaves of *J. spicigera*, *H. patens* and *A. montana*, revealed the presence of the heavy metal in the following order of descent: Fe>Pb>Cd (Table 1).

Table 1. Heavy metal content (plant tissue).

Plants	Lead (mg/kg)	Cadmium (mg/kg)	Iron (mg/Kg)
<i>Justicia spicigera</i>			
Roots	34.0 ± 1.2	2.3 ± 0.5	309.0 ± 20.2
Stems	65.0 ± 7.0	18.5 ± 3.9	52.0 ± 1.3
Leaves	25.0 ± 1.3	13.5 ± 4.2	53.0 ± 0.4
<i>Hamelia patens</i>			
Roots	4.0 ± 0.7	3.2 ± 0.4	340.0 ± 24.0
Stems	5.0 ± 0.8	8.5 ± 1.1	148.0 ± 12.0
Leaves	4.5 ± 1.2	1.2 ± 0.3	285.0 ± 22.0
<i>Arnica montana</i>			
Roots	2.5 ± 0.3	2.3 ± 0.2	212.0 ± 13.0
Stems	1.6 ± 0.7	3.5 ± 0.7	98.0 ± 8.0
Leaves	1.3 ± 0.2	38.0 ± 1.8	180.0 ± 11.0

In general, roots revealed greater metal concentrations than stems and leaves. The highest concentrations of Fe were exhibited in *H. patens*, whereas the maximum accumulation of Cd and Pb was recorded in plants of *Justicia spicigera* (Fig.1).

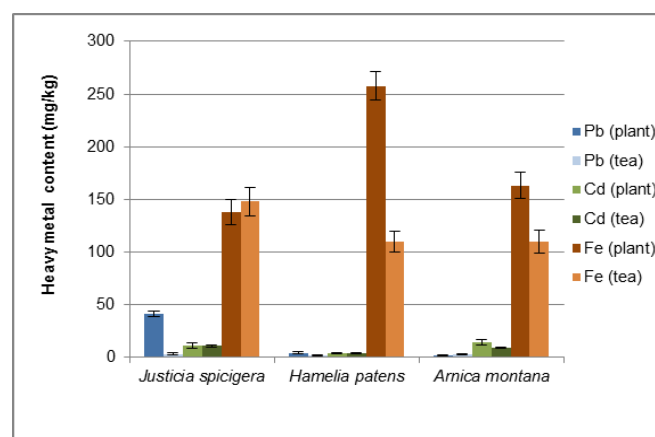


Fig.1 Heavy metal content (plant tissue and extracts).

Conclusions. Our results show that tea infusions from leaves of the medicinal plants *J. spicifera*, *H. patens* and *A. Montana* are good source of iron. However, the non-essential elements Pb and Cd were found in high concentrations in these extracts. Therefore, it is highly recommended to grow these medicinal plants on orchard under control conditions.

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