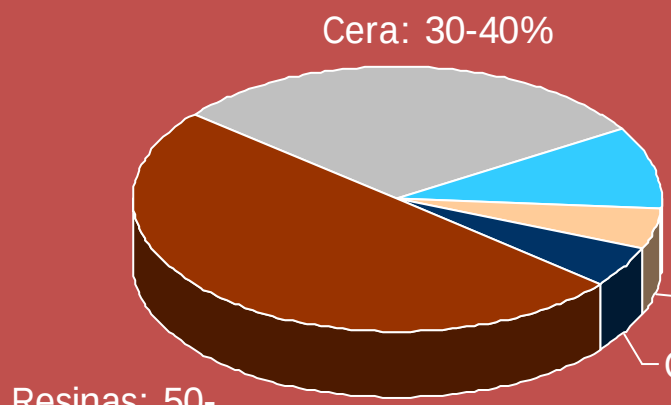
INFLUENCE OF PHITOGEOGRAPHICAL REGIONS ON HEAVY METALS´ CONTENT IN PROPOLIS FROM ARGENTINE NORTHWEST

Alvarez, A.[1]; Sales, A. [2]; Maldonado, L.[1]; Rodriguez Areal, M.[2]; Salomón, V.[1]; Marchisio, P.[2]; Rodriguez, M. [2]; Bedascarrasbure, E[1].

1 INTA PROAPI, EEA Famaillá, Ruta 301 km 32, Famaillá, Tucumán, Argentine.email: aalvarez@correo.inta.gov.ar
2 Departamento de Química Analítica, Fac. de Bioquímica, Química y Farmacia , Univ. Nac. de Tucumán, Ayacucho 471, Tucumán, Argentine..

Propolis of *Apis mellífera* is a mixture of components



Macro components:

Quantities depends on geographical origin

Chemical composition:

Complex – Variable (botanical- geographical origin, times of year)

Terapeutical properties

- Antioxidant
- Antimicrobial
- Antiinflamatory
- Antitumoral

Terapeutical properties ⇔ Chemical composition

Resins

↓

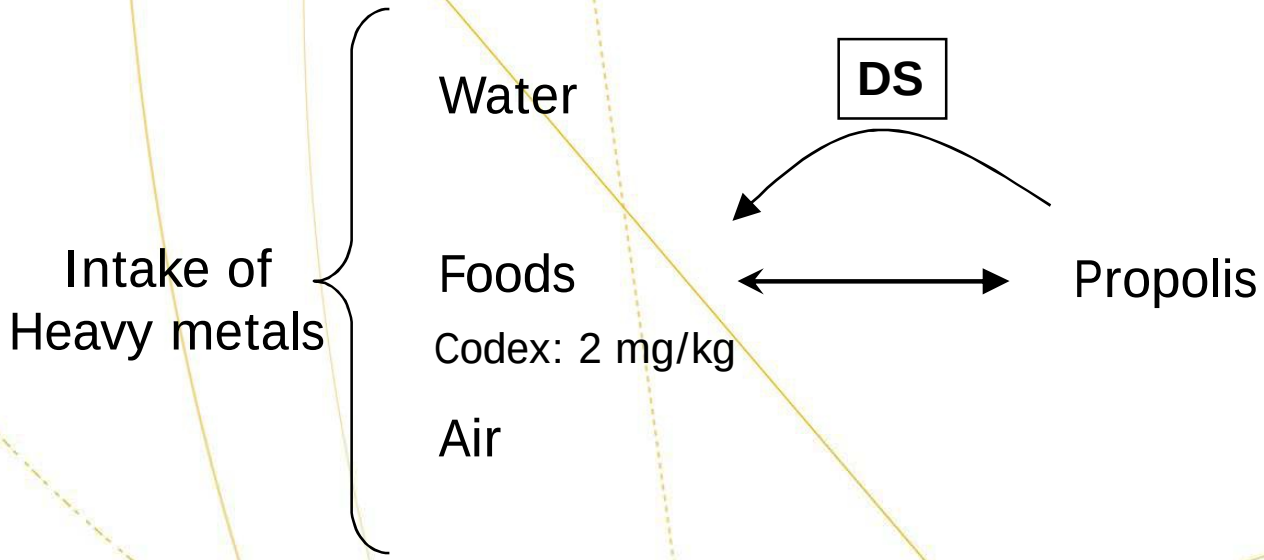
Bioactive compounds
(Phenolics)

- Acids
- Esters
- Flavonoids
  - AOX
    (prevention de CV diseases)
  - Reaction with metals:
    Quelates

Reaction with metals

Flavonoids

- Iron, Cupper → Generation of free radicals (Fenton)
- Aluminium → Identification
- Lead, Arsenicum → Pollutants



- In 1994 FDA detected lead in dietary supplements (with propolis) in USA, with values from 1 to 1570 mg/kg.

- In United Kingdom, Food Standards Agency (1995) reports values from 2.3 a 461 mg/kg of lead in 20 samples of propolis from British Beekeepers Association.

- Alcici y col. (2002) reports values of lead from 2.7 a 3.1 mg/kg and from 19 to 48 mg/kg in brazilean propolis harvest with different methods

Origin of heavy metals in propolis

The heavy metals found in propolis may come from the atmosphere or it may be incorporated in the harvest, extraction and processing.

Harvest Methods

Scrapping

Mosquito netting

Plastic netting

Effect of harvest method

Treatment	Content of lead (mg/kg) ± e.e.	Groups
Scrapping	7,0 ± 1,5	A
Mosquito netting	1,6 ± 0,1	B
Plastic netting	1,2 ± 0,1	B

Objective

- The aim of this work was analyze the influence of two phitogeographical regions, with signficative difference in flavonoids´ level, on heavy metals´ content in propolis.

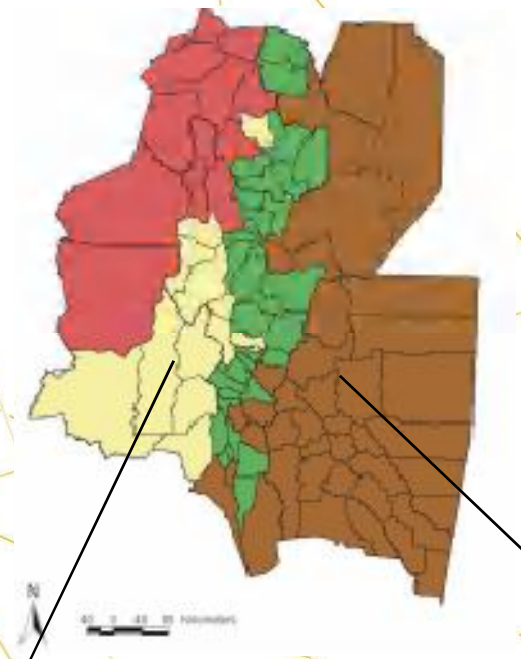
Materials and methods

It was analized the content of lead and arsenic in 28 samples of propolis obtained with the same harvest´s method: plastic netting.

Materials and methods

Samples are procedent from two phitogeographical regions: Calchaqui Valleys and Chaquenean Park. Analysis of variance was done to find significative differences between regions.

Phitogeographical Regions



Calchaqui Valleys

Chaquenean Park

Treatment of samples

1- Propolis were ashed at 400 ºC to mineralize the samples.

2- Ash were diluted with nitric acid 20% v/v.

3- Solutions were analyzed by Atomic Absorption.

Materials and methods

Lead content was determined by Atomic Absorption with graphite furnace,and Arsenicum by Flame Atomic Absorption with hidride generation.

Results

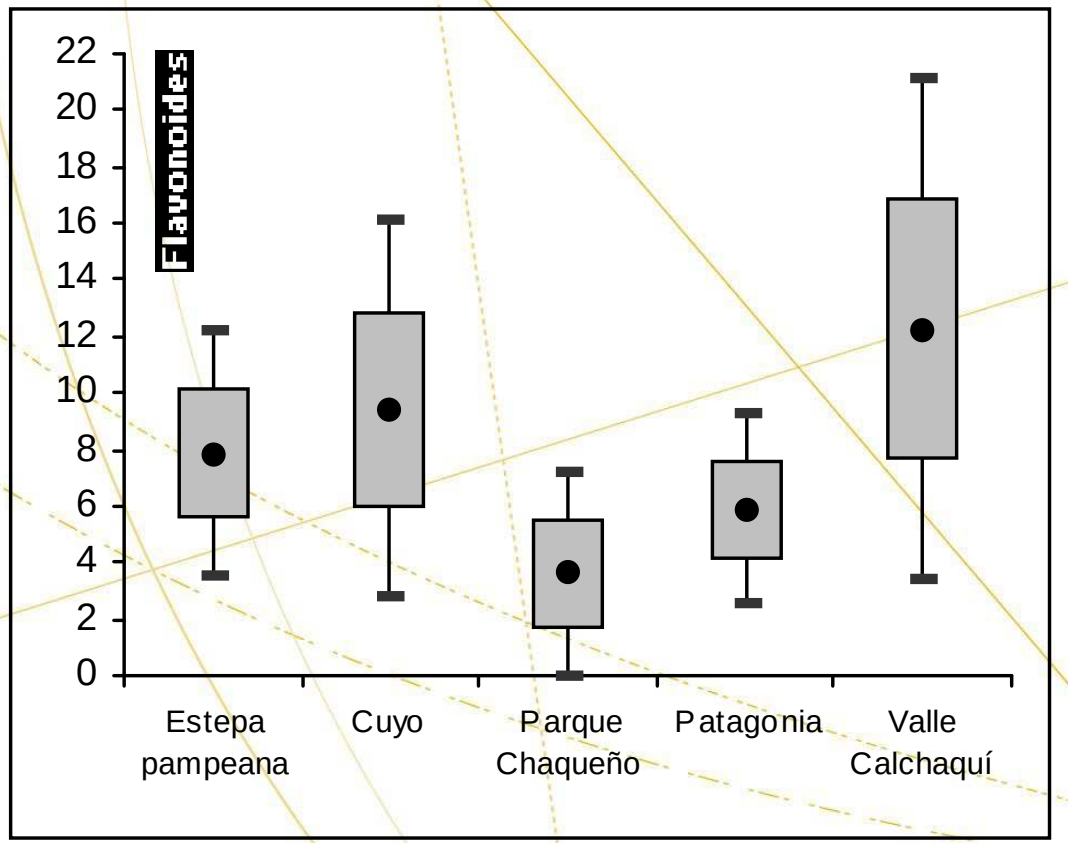
Region	Lead $mg.kg^{-1}$	Arsenicum $mg.kg^{-1}$
Chaquenean Park	0,73 ± 0,09	0,12 ± 0,02
Calchaqui Valleys	1,10 ± 0,14	0,30 ± 0,14

Results

It was observed a significative higher content of heavy metals in Calchaqui Valleys than Chaquenean Park.

Bibliography reports higher content of flavonoids in propolis from Calchaqui Valleys than the propolis from Chaquenean Park, and this might originate the higher content of heavy metals.

Results


Flavonoides
22
20
18
16
14
12
10
8
6
4
2
0
Estepa pampeana
Cuyo
Parque Chaqueño
Patagonia
Valle Calchaquí

Conclusions

1- It was observed a significative higher content of heavy metals in Calchaqui Valleys than Chaquenean Park.

2- It was determined higher lead´s content than arsenicum content in other samples.

3- All the samples analyzed presented lead and arsenic`s content lower than the maximum limit established in the Food Argentine Code.

We are thanked to

1- National Institute of Agricultural Technology by financing the Project.

2- National University of Tucuman by supporting in validation of analytical methodology of Atomic Absorption Spectrometry.

3- Beekeepers from Argentine Northwest by sending the samples of propolis.

¡ Thanks for your attention !