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"In vitro" evaluation of the anti-helminthic potential of extracts from five Colombian plants

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INTRODUCTION

Figure 1. Larvae filariforme (L3) of *S. stercoralis* Source: CDC

Strongyloidiasis is a disease caused by *Strongyloides stercoralis* and *Strongyloides fuelleborni*, two species of soil-transmitted helminths. Currently, it is predominately described as a neglected tropical disease.

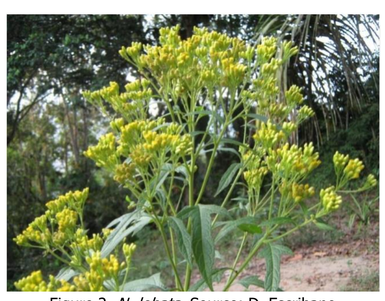

Figure 2. *N. lobata* Source: D. Escribano

It is estimated that 30–100 million people are infected worldwide. Without the appropriate therapy, the infection does not resolve and it may persist for life. The infection may be severe and even life-threatening in cases of immunodeficiency[1].

Natural products derived from plants offer a variety of therapeutic alternatives based on their bioactive compounds. Ethnobotanical studies in the Caribbean Colombian report of the traditional use of plants for to treat parasitic diseases[2].

OBJECTIVE

The objective of this work was the evaluation of the anti-helminthic activity of alcoholic extracts from five Colombian plants with ethnobotanical background and the determination of the Inhibitory Concentration 50 (IC_{50})

METHODOLOGY

The plants of study were properly identified by a botanist. The alcohol extracts were obtained by cold percolation of their leaves, filtered and taken to dryness by rotated evaporation under reduced pressure. The *"in vitro"* activity was evaluated on stage 3 larvae of *S. venezuelensis* according to the technique described by Legarda *et al*[3] through a direct counting technique, and MTT assay. The extracts were evaluated in triplicate tests and the IC_{50} was calculated for each extract. Ivermectin was used as pharmacological control.

RESULTS

Table 1. Anthelmintic activity of plant extracts

Identified species	Code	Solvents	Dry leaves weight (g)	Extracts weight (g)	Extract yield (%)
Piper peltatum (Piperaceae)	PP-1	Ethanol	40.3	2.3	5.7
Baccharis inamoena (Asteraceae)	BI-2		45.2	6.0	13.2
Neurolaena lobata (Asteraceae)	NL-3		96.3	1.7	1.7
Clibadium arboreum (Asteraceae)	CA-4		141.2	5.6	3.9
Castanedia santamartensis (Asteraceae)	CS-5	Methanol	539.8	54.6	10.1

In Table 1 we show the selected plant species, with the respective assigned codes for their extracts, the solvents used in the extraction process, the weight in grams of the dried leaves, the weight in grams of the dried extracts, and the yield of each extract expressed as percentage.

The figure 3 shows the IC_{50} of each extract expressed in µg/mL. The four ethanolic extracts tested showed biological activity against the *S. venezuelensis* parasite with IC_{50} values below 200 µg/mL, while the methanolic extract of *C. santamartensis* showed an IC_{50} value higher than 200 µg/mL. Ivermectin (iv) killed 100% of *S. venezuelensis* larvae at 48 hours of incubation at a concentration of 10 µg/mL.

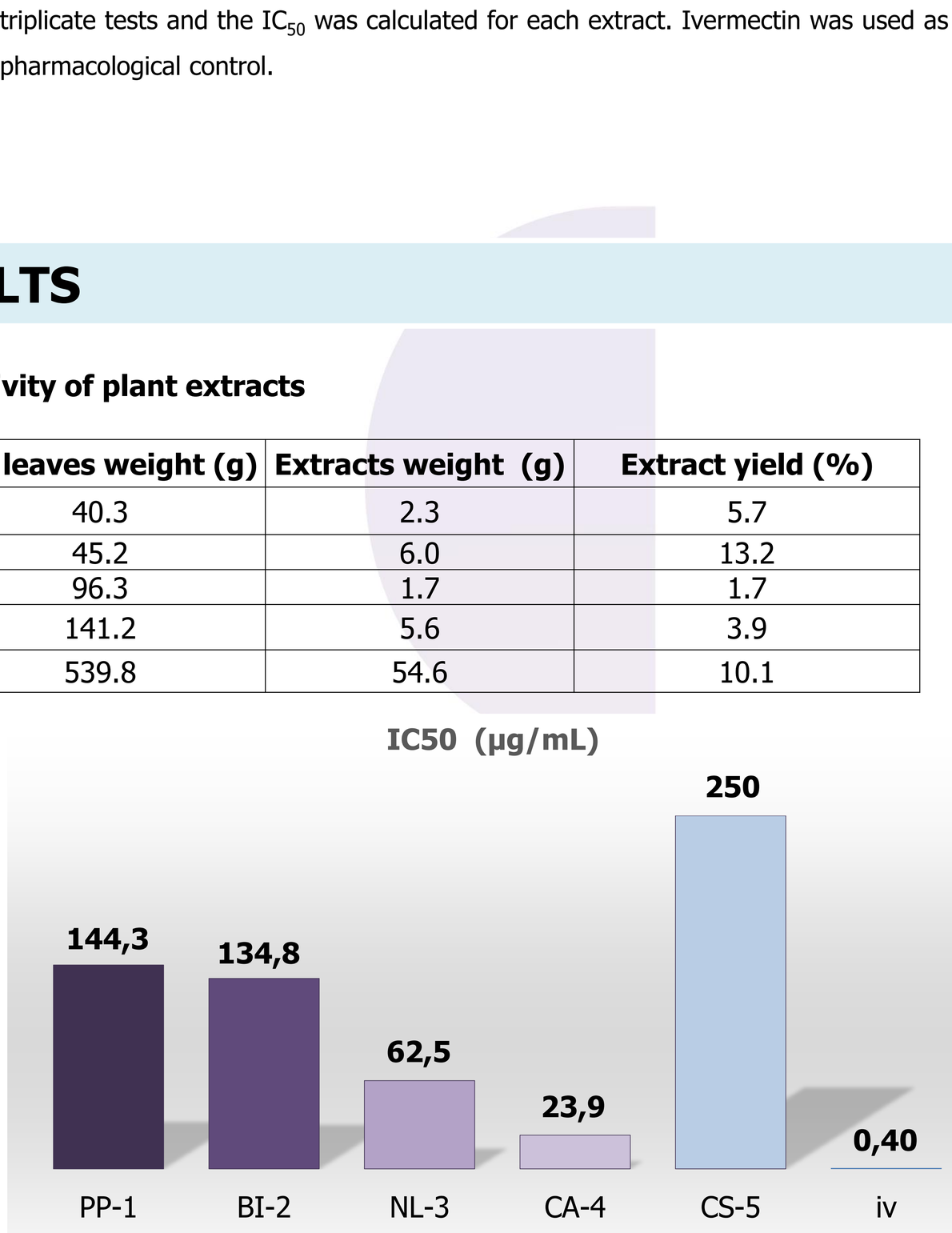

Figure 3. Inhibitory Concentration 50%

CONCLUSIONS

- Four of the five Colombian extracts tested showed good *"in vitro"* anti-helminthic activity.
- The extract of *Clibadium arboreum* showed the highest *"in vitro"* anti-helmintic activity, with the lowest IC_{50} value (23.9 µg/mL)

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