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## Mobilizing tropical plants as a sustainable alternative to the issue of anthelmintic resistance in small ruminants

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## Introduction

Condensed tannins (CT) are **complex polyphenolic secondary metabolites** from plants. **Protein-CT complexes in ruminants** could result in affection of **rumen fermentation** (Min et al., 2001), allow **availability of amino-acids** and induce a gastrointestinal **nematicidal action** (Marie-Magdeleine et al., 2010). A preliminary study was conducted in order to evaluate *in vitro* the effect of several CT types, against various **chemical-resistant strains** of the parasite *Haemonchus contortus*.

## Materials and Methods

Study of **CT from 8 plant species from 6 botanical families** (CT 1 to CT 8).

• **Extraction**: acetone/water (3:7; v/v).

• **Chemical quantification and elucidation**: thiolysis, LC-MS : Procyanidin/Prodelphinidin ratio

• **Biological activity** : **Drug resistance** against thiabendazole (Thia), Moxidectin (Mox), levamisole (Lev), ivermectin (Ivm) ; and CT **Anthelmintic *in vitro* assays** against L3 stage migration and exsheathment of 5 strains of *H. contortus* (B, C, G, J and R) : 5 concentrations of CT and 3 repetitions, PBS control. Calculation of efficient concentration for 50% inhibition EC50.

## Results

Figure 1. Drug resistance of *H. contortus* strains

% L3 migration			
Chemical drug	<i>H. contortus</i> strain		
Thia	57.6 <sup>a</sup>	B	18.0 <sup>cd</sup>
Mox	33.4 <sup>b</sup>	C	47.9 <sup>a</sup>
Lev	8.5 <sup>c</sup>	G	11.1 <sup>d</sup>
Ivm	8.1	J	33.6 <sup>b</sup>
		R	24.1 <sup>bc</sup>

Strains G, J, B and R : Resistant to MOX and THIA, susceptible to IVM and LEV

Strain C : Multi-resistant to IVM, LEV, MOX and THIA

Figure 2. Prodelphinidin content in condensed tannins

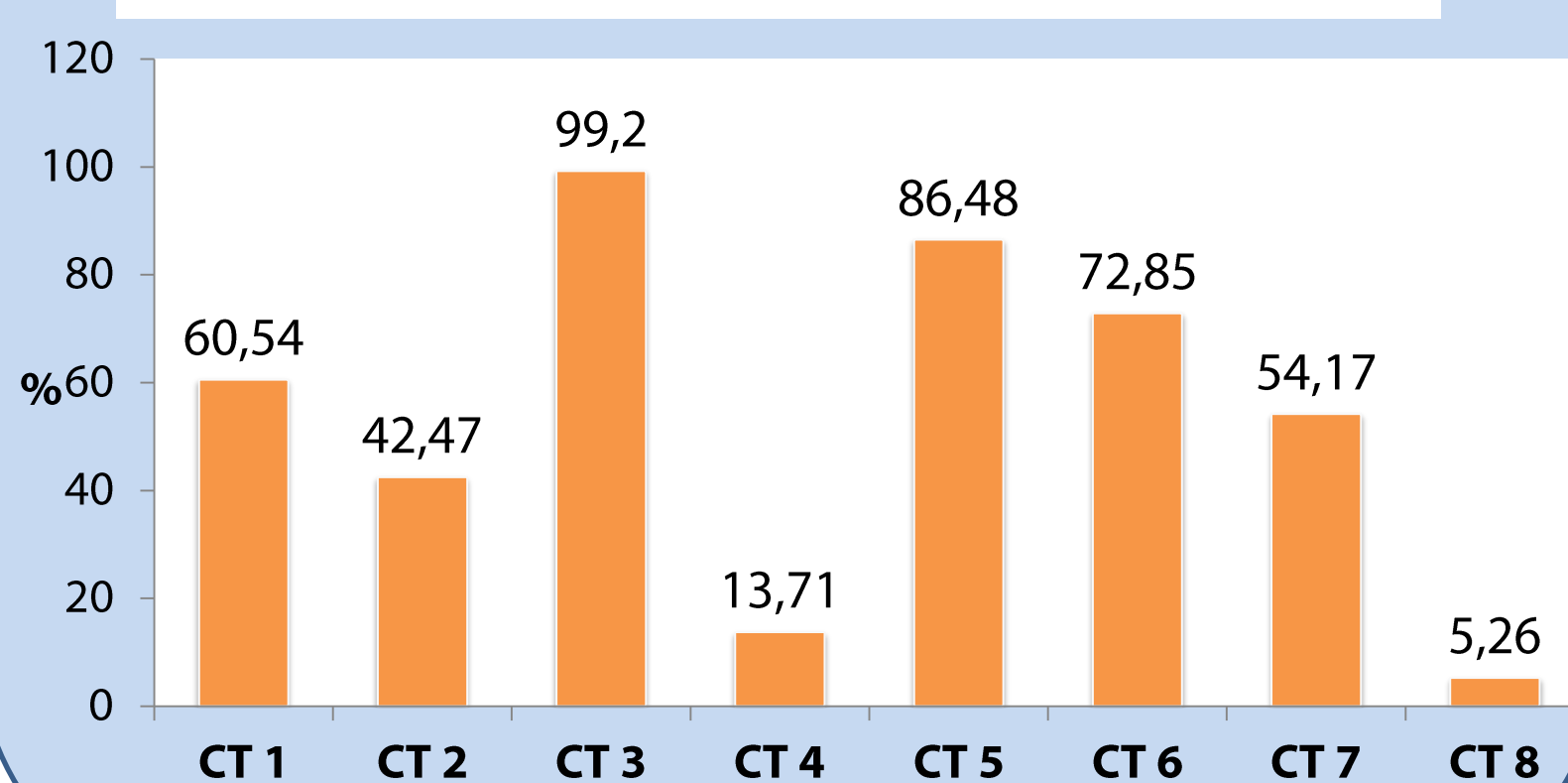
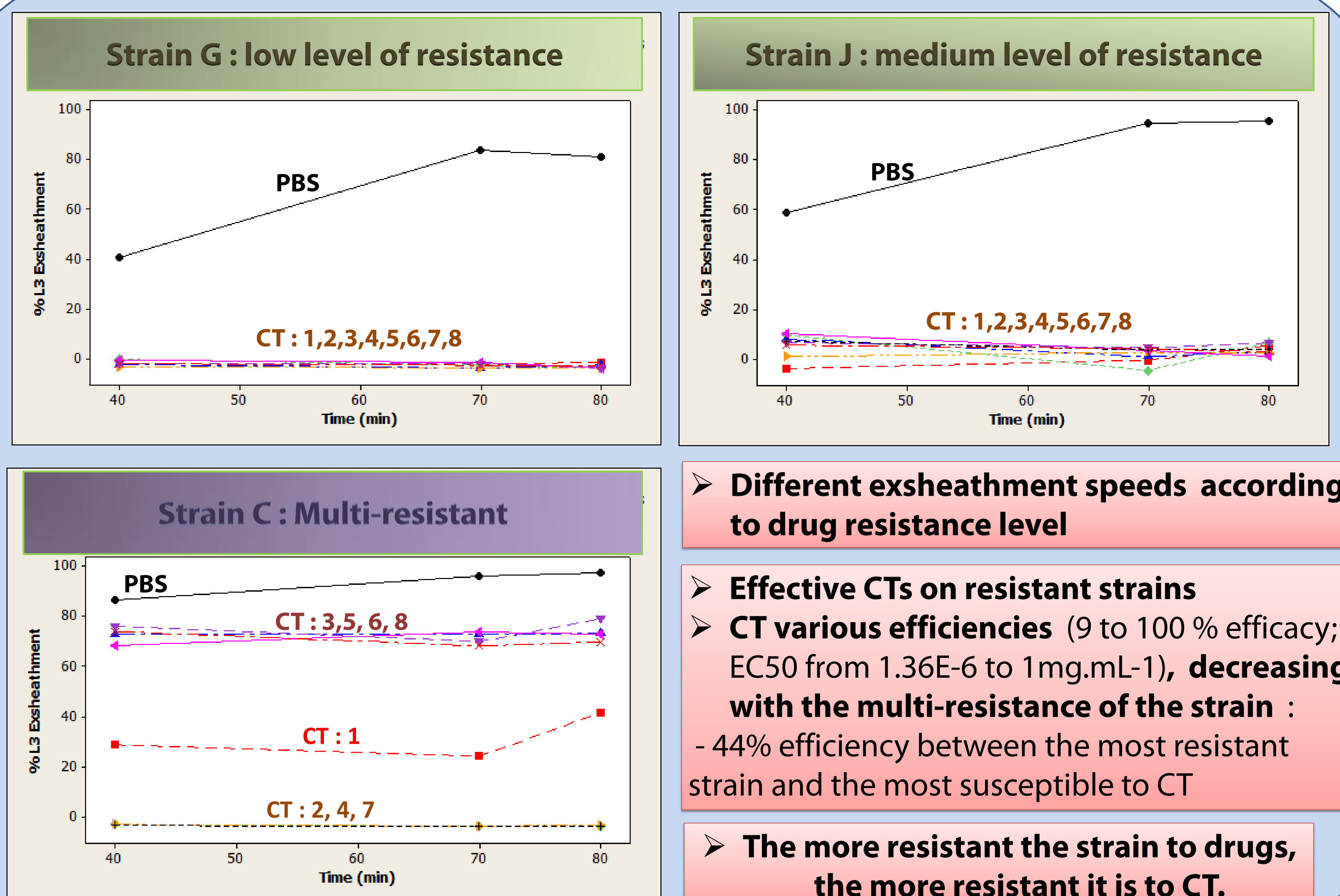


Figure 3. Effects of condensed tannins on the exsheathment kinetics of three strains of *H. contortus*



## Conclusion

It seems that the **structural complexity of condensed tannins**, the presence of other active compounds in the plant extracts, but also **the nature of the parasite resistance**, could affect the **tannin-protein interactions**.

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**References** Marie-Magdeleine, C., Boval, M., Philibert, L., Borde, A., Archimède, H., 2010. Livestock Science 131, 234-239.

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