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

Carine Marie-Magdeleine, Rachel Bernier, Yoann Felicite, Lucien Philibert, Javier Arece Garcia

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MARIE-MAGDELEINE C¹., BERNIER R¹., FÉLICITÉ Y¹., PHILIBERT L.¹, ARECE GARCIA J.²

¹ URZ Recherches Zootechniques, INRA, 97170, Petit-Bourg (Guadeloupe), France

² EEPF "Indio Hatuey", Universidad de Matanzas, Central España Republicana, CP44280-Matanzas, Cuba

Contacts: carine.marie-magdeleine-chevry@inra.fr

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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 ^a	B	18.0 ^{cd}
Mox	33.4 ^b	C	47.9 ^a
Lev	8.5 ^c	G	11.1 ^d
Ivm	8.1	J	33.6 ^b
		R	24.1 ^{bc}

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

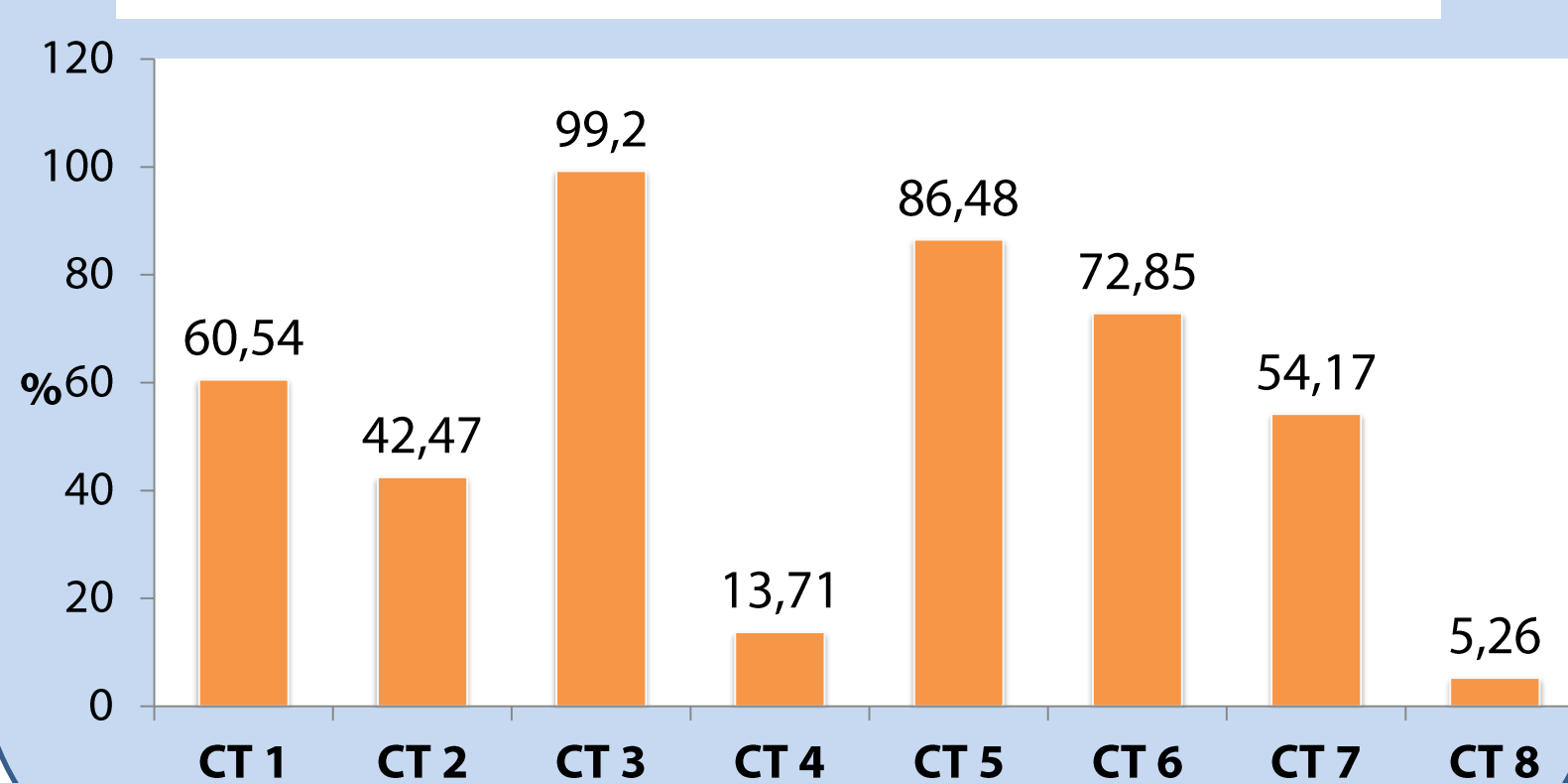
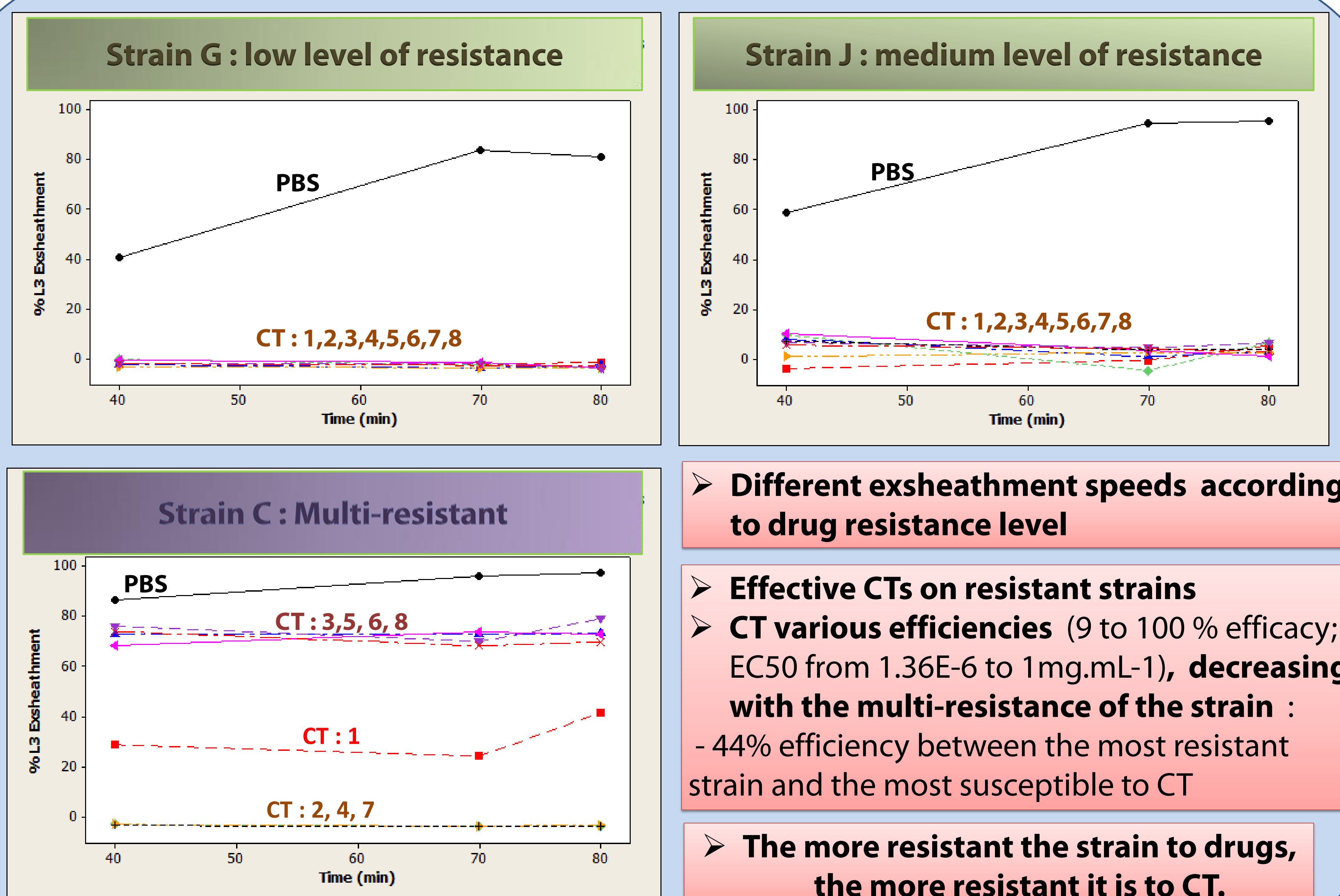


Figure 3. Effects of condensed tannins on the exsheathment kinetics of three strains of *H. contortus*



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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