TRICHINELLA SPECIES IDENTIFICATION BY MALDI-TOF

Collaborating Centre for Foodborne Zoonotic Parasites

Grégory KARADJIAN[1], Peter BAHN[2], Anette JOHNE[2], Benoit GASSILLOUD[3], Jean-Sébastien PY[3], Anne MAYER-SCHOLL[2] & Isabelle VALLEE[1]

[1] *UMR BIPAR, ANSES, ENVA, INRA, NRL Foodborne Zoonotic Parasites, Animal Health Laboratory, Maisons-Alfort, France*

[2] *Department Biological Safety, German Federal Institute for Risk Assessment, Berlin, Germany*

3 *Laboratoire d'Hydrologie de Nancy, ANSES of Nancy, France*

INTRODUCTION - Trichinellosis is due to the consumption of low or uncooked meat contaminated by larvae belonging to the *Trichinella* genus consisting of nine species and three genotypes. Up-to-date, species identification is based solely on molecular biological tools that can be tedious and slow to implement.

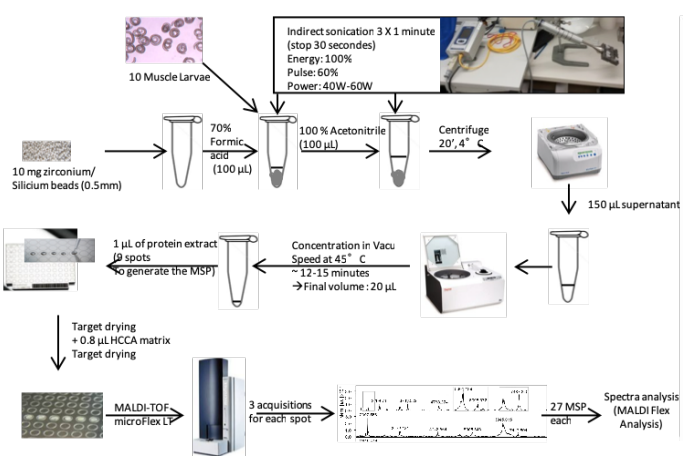
The use of MALDI-TOF (Matrix Assisted Laser Desorption / Ionization - Time of Flight) mass spectrometry technology would make identification of these parasites much faster and easier. The aims of this study was:

i) to confirm the efficiency and reproducibility of the protein extraction protocol (Mayer-Scholl et al, 2016);

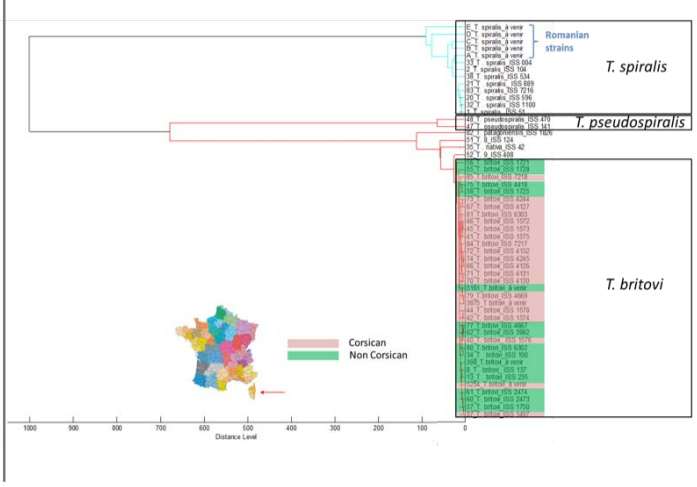
ii) to evaluate the capacity of MALDI-TOF mass spectrometry to discriminate *Trichinella* species and strains within the same species;

iii) to compare MALDI-TOF proteomic approach to classical molecular biology techniques.

METHODS



RESULTS



COMPARISON TO CLASSICAL MOLECULAR TOOLS

Parameter observed	Multiplex PCR	PCR-RFLP	PCR + sequencing	MALDI-TOF
Term	1 day (if sample received in the morning)	1-2 Days	3 jours + sequence analysis	**1h30**
Samples number	Easily 96 PCR Gel = 96 deposits	Easily 96 PCR RFLP = 96 mix deposits Gel = 96 deposits (X2)	Easily 96 PCR Gel = 96 deposits Sequencing	**96 / plate**
Robustness	Some supplementary bands (Karadjian et al., 2017)	**Robust**	Sometime incomplete sequences	**Robust**
Larvae number	**1 larvae**	**1 larvae**	**1 larvae**	5-10 larvae (up-to-date)
Degraded larvae	Can be OK	Can be OK	Can be OK	Seems not OK
Control needed	YES / 1 by species →bands pattern	YES / 1 by species →bands pattern	YES / extraction control + PCR control 1/species	**NO because database**
Cost/sample (estimation)	6,58 euros (including controls)	7,27-8,58 euros (including controls)	11,5 euros (not including controls)	**1,98 euros**

CONCLUSION

The use of MALDI-TOF for *Trichinella* species identification has advantages:

- far much faster and cheaper
- robustness
- allowance to assay a lot of samples at the same time

NRL Workshop
23-24/05/2019