

# *In vitro* anthelmintic effects of bark extracts from *Picea abies* and *Pinus sylvestris* against sheep nematodes

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## Introduction

Gastrointestinal nematodes (GIN) in sheep are a common cause of reduced animal health, welfare and performance, and thus, high economical losses. The emerging drug resistance in GIN prompts for new methods in combating infections. Several studies have indicated an anti-parasitic effect of tannin-rich plants when included in the diet.

**Objective:** to assess the potential anthelmintic efficacy of tannin-rich extracts from bark of common Norwegian trees (spruce (*Picea abies*) and pine (*Pinus sylvestris*)) against gastrointestinal nematodes of sheep.

## Materials and Methods

- Serial dilutions of bark extracts from spruce and pine were tested in five concentrations.

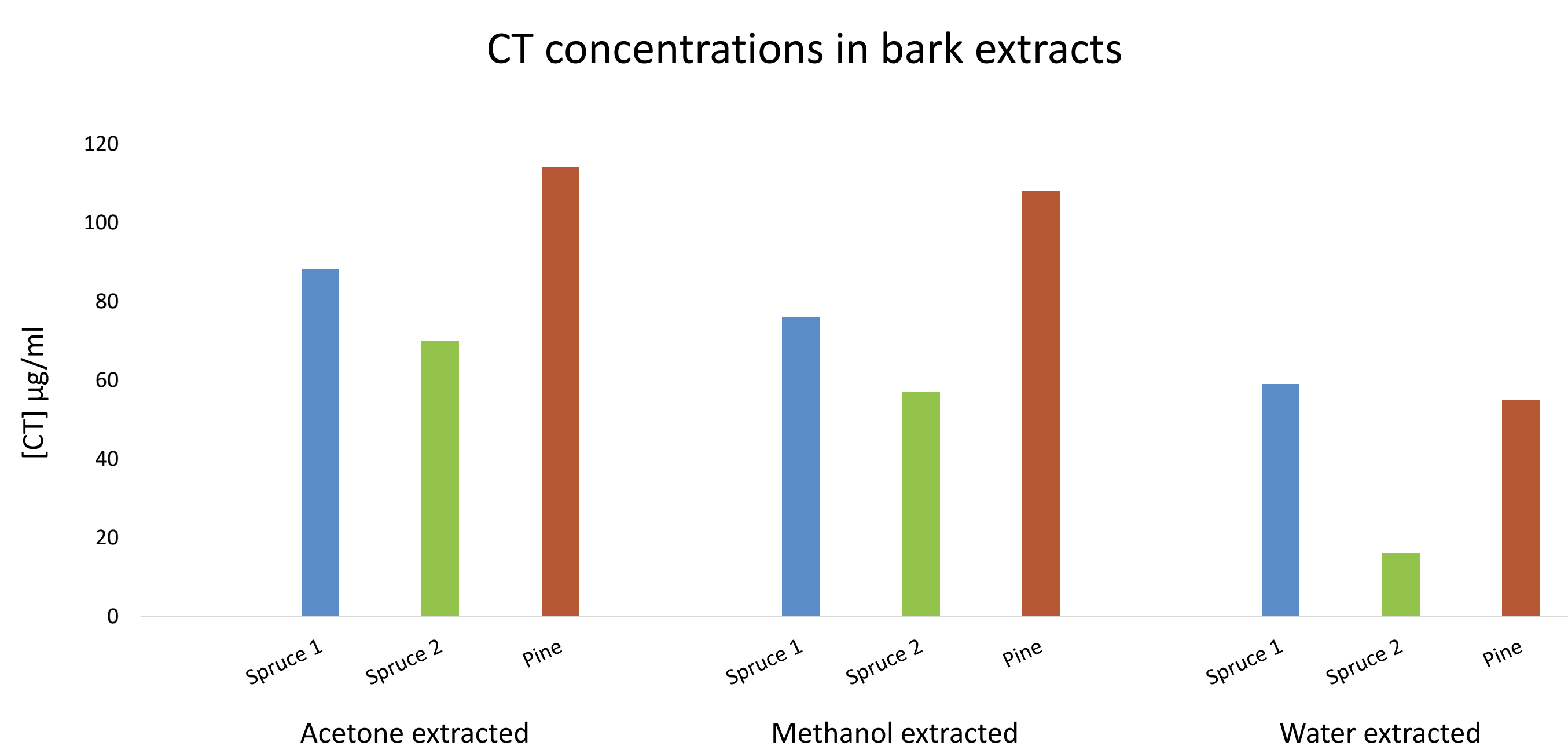


Fig. 1 Concentrations of condensed tannins (CT) from three bark samples in relation to the different extraction methods. Acetone, methanol and water were used as solvents.

- The anthelmintic efficacy was assessed by egg hatch assay (EHA)<sup>1</sup>. Eggs and larvae were counted after 48 hours incubation at room temperature, and egg hatch percentage (EH%) was calculated.
- Larval motility assay (LMA-RTCA) was conducted utilizing a real-time cell monitoring device (xCELLigence)<sup>2</sup>.

## References

- von Samson-Himmelsjerna G et al. (2009). Parasitol Res. 105:825–834
- Smout MJ et al. (2010). PLoS Negl Trop Dis 4(11): e885.

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## Results

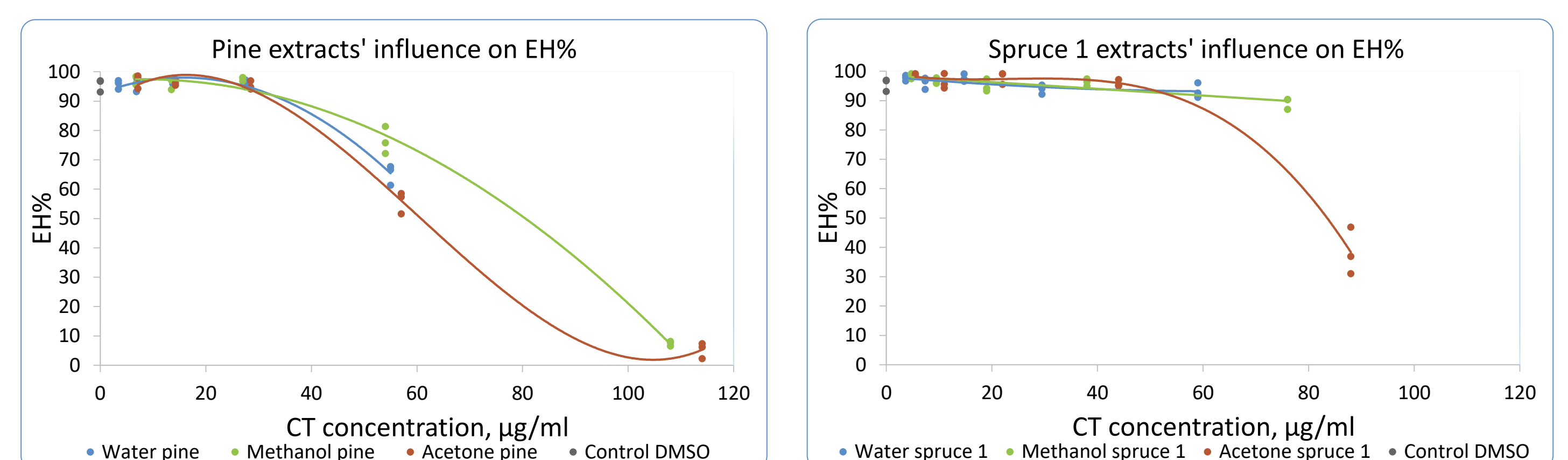


Fig. 2 The acetone and methanol pine extracts reduced the EH% to <10%. The methanol and water spruce 1 extracts gave an EH% of 90-100%.

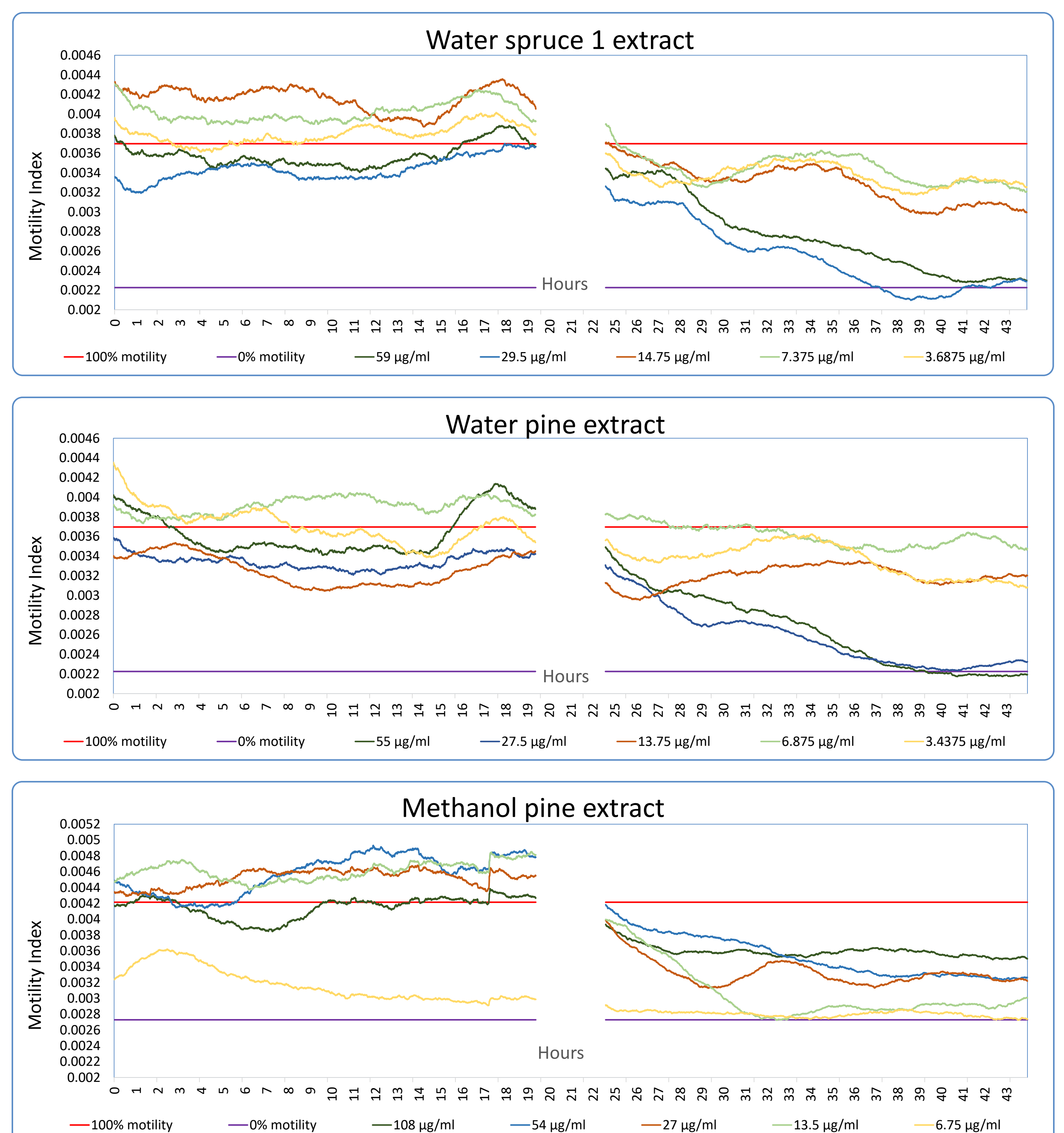


Fig. 3 The methanol and acetone pine extracts gave a reduction in larval motility in all concentrations. The water extracts and the methanol pine 1 extract had motility reducing efficacy in the two highest concentrations.

## Conclusions and future work

- Condensed tannins extracted from Pine bark, by means of methanol and acetone, demonstrated the highest anthelmintic efficacy in both methods tested (EHA, LMA).
- In accordance with previous studies a positive correlation was found between anthelmintic efficacy and CT content of the extracts.
- There will be conducted *in vivo* trials based upon these results to assess the efficacy of the bark extracts in GIN in sheep.
- We are currently conducting *in vitro* experiments testing the bark extracts on *Cryptosporidium parvum*.