In vitro anthelmintic activity of three medicinal plants.

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Abstract

In vitro anthelmintic assay of three medicinal plants was conducted to investigate which plants were anthelmintic. In vitro anthelmintic activity of all the three medicinal plants were carried out using earthworm at 50, 100, 200mg/ml of plant extracts from *Vernonia amygdalina, Ocimum grattisimum and Talinum triangulare*. Results showed that 200mg/ml was effective concentration for all the medicinal plants. *Vernonia amygdalina* showed faster anthelmintic than *Ocimum grattisimum* and *Talinum triangulare*.

The plants can be used /employed in pharmaceutical industry to be used as anthelmintic drugs for treating livestocks affected with helminths.

Keywords: medicinal plants, anthelmintic, pharmaceutical industry, concentration.

Introduction

Parasitism affects the health of livestock and cause reduction in productivity of livestock. Ruminants in Ekiti State are affected by various species of nematodes. Infections by gastrointestinal helminth parasites are considered as economically important diseases of grazing livestock (Perry et al., 2002). They caused reduction in animal products (meat, milk, hides and skin), manure, which affect the livelihood of small holder farmers (Perry and Randolph, 1999). Parasitic diseases cause mortality and morbidity in livestock. Rahman and Mondal, (1983) have reported examples of parasitic diseases, gastrointestinal nematodes such as *Haemonchus Sp, Trichostrongylus sp, cooperia, Oesophagostomum sp, Trichuris sp and strongloides sp* as the most common ones.

Synthetic anthelmintic has been used to cure these helminths. But they have side effects/disadvantages of using them which are they are expensive, unavailability, resistance to helminth parasites (Waller and Richard, 1985), their residues and toxicity problems (Kaemmerer and Butenkolter, 1973). These have affected development in livestock. As a result of this, another possible way such as the use of medicinal plants has been introduced.

The aim of this study was to use three medicinal plants to treat earthworm in vitro. Since earthworm had physiological resemblance to human nematode. So the effect produce could be related to what will occur if nematodes were used in humans.

Materials and Methods

Collection of plant materials

Plant materials (*Vernonia amygdalina, Ocimum grattisimum, and Talinum triangulare)* were collected from around the house in Ado-Ekiti and dried for 2 months. They were authenticated in the department of Plant Science at Ekiti State University Ado-Ekiti.

Plant material and preparations

The leaves of the medicinal plants were air dried for 2 months. After which it was grinded into powder using a blender. 262ml of ethanol was put into 74.8g of *Vernonia amygdalina*, 262ml of ethanol was put in 74.64g of *Ocimum grattisimum* while 75ml of ethanol was put in 21.57g of *Talinum triangulare*. They were soaked for 72hrs. After which it was filtered using filter paper. The filtrate was left to stand for 4 days for the ethanol to evaporate to remain the extract of the plants.

Different concentration 50, 100, 200mg/ml of each extract solution were prepared by diluting the stock solution using distilled water. Distilled water was used to treat the normal control group

Worm Collection

Lumbricus (earthworm) nearly equal size 4cm was collected from the stream near school of Agricultural Science at Federal University of Technology Akure.

Anthelmintic activity

Anthelmintic activity was performed on medium size earthworm. It has anatomical and physiological resemblance with the intestinal round worm parasites of human beings.

Lumbricus sp was placed in petric dish containing three different concentrations (50, 100, 200mg/ml) each of the plants. In each petric dish was placed with 5 worms and observed for paralysis/ death. The number of worms that were paralysed when no movement of any sort could be observed, except when the worm was shaken vigorously and when they die were noted. The test results were compared with control which was distilled water.

Results

Effects of three medicinal plants on earthworm

The plant extracts showed anthelmintic effect by causing death of the worms at all the concentrations, but the time of death was different in each case (Fig 1, 2 and 3). *V. amygdalina* (Va) extracts showed fastest effect by causing death of the entire worm by 2hr 15min than *O. grattisimum (Og) and T. triangulare (Tt)* which were at 4h and 5h at all the concentration compared to control at 2h (Fig 1,2 and 3). However, at 200mg/ml this concentration caused fastest death than other concentrations in all the plant extracts and it occurred fastest in *O. grattisimum* compared to control (Fig 1, 2 and 3). It *took T. triangulare* 3h 45min before it starts having effect on the worms while the death was by 30 min in *V. amygdalina and O. grattisimum compared to control (Fig 1,2 and 3)*. Moreso, *T.triangulare* caused worms to be shrinking up and then break before they die, which does not happen in *V.amygdalina* and *O. grattisimum*.

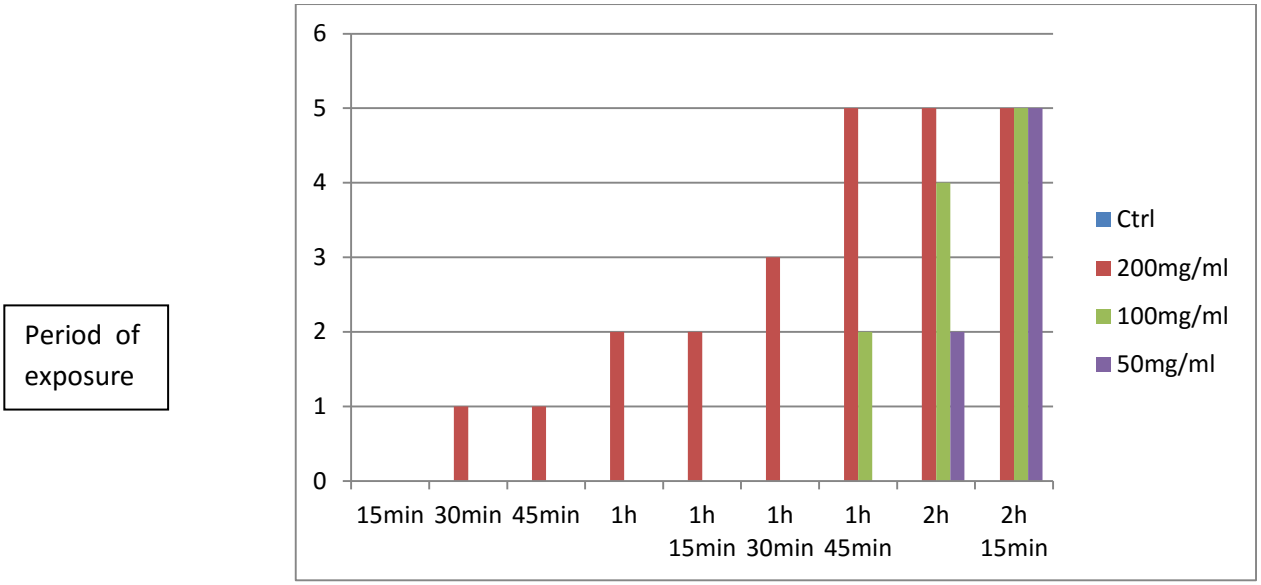

Fig 1: Effects of *Vernonia amgydalina* on earthworm

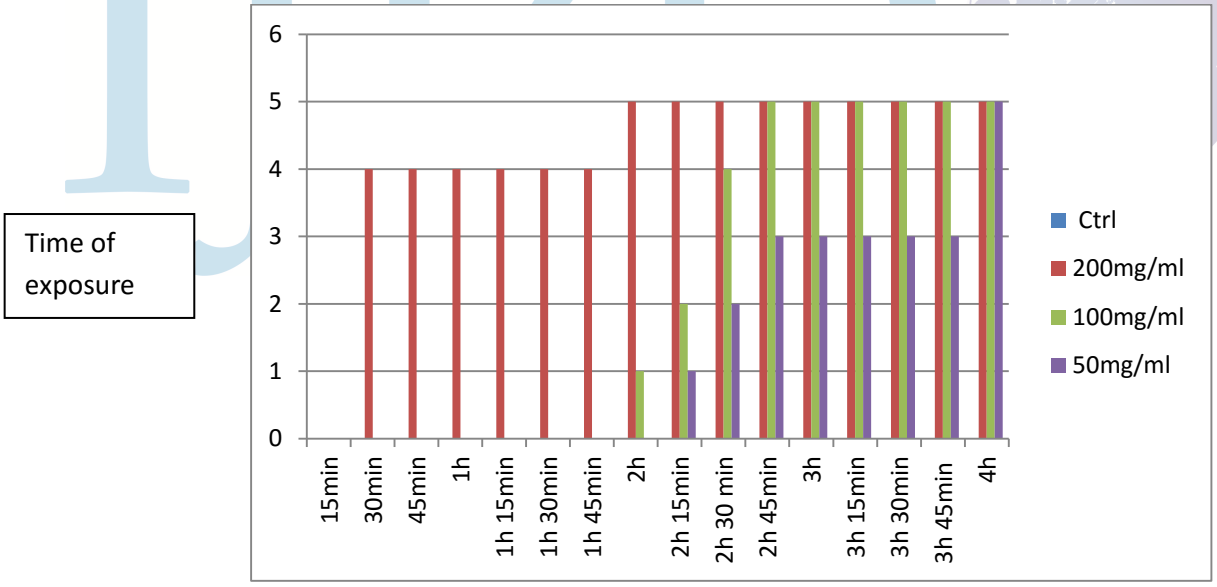

Fig 2: Effects of *Ocimum grattisimum* on earthworm

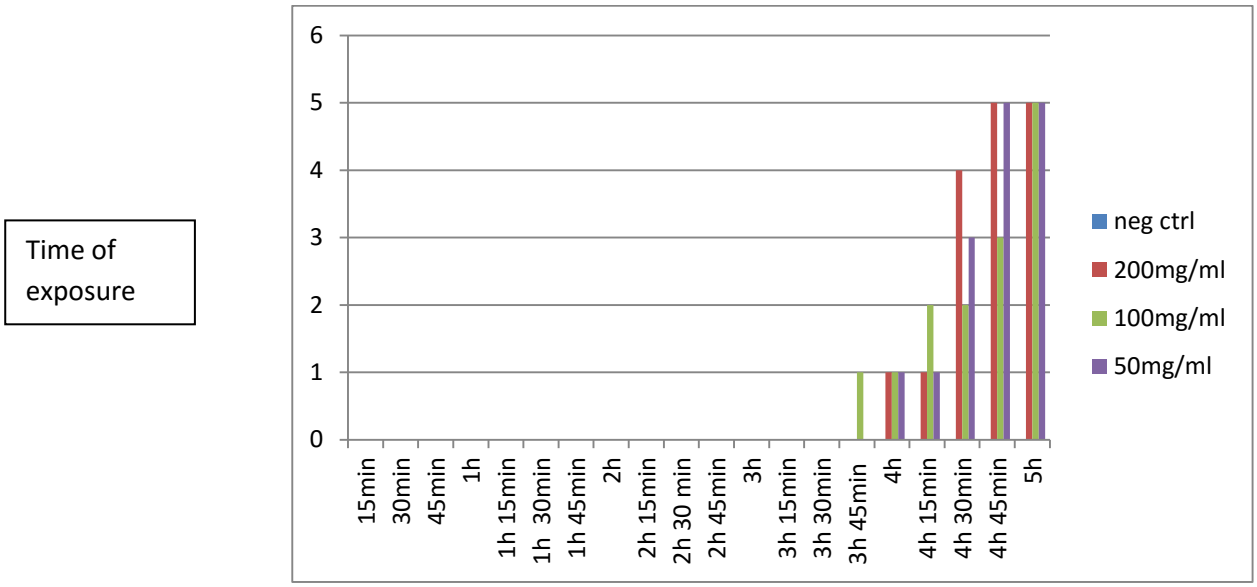

Fig 3: Effects of *Talinum triangulare* on earthworm

Discussion

Effects of three medicinal plants on earthworm

Earthworm had been shown to have the same physiological resemblance to human nematode; as a result, the effects of three medicinal plants on earthworm were investigated.

The presence of tannin, alkaloid, flavonoid in all the plants may be responsible for death of the worms i.e. antihelmintic effect of the three medicinal plants (Nalule et al., 2013; Offiah and Chikwendu 1999; Adeola et al., 2015). Tannin caused death by binding to glycoprotein in the cuticle of parasite and cause death (Thompson and Geary, 1995).

The results showed that 200mg/ml of the medicinal plants was effective in killing the earthworm, this mean that the concentration of 200mg/ml was effective for all the three medicinal plants (*V. amgydalina O. grattisimum and T. triangulare)* to kill the earthworm at 2h 15min, 4h and 5h(Danquah et al., 2012). The compounds in *V. amgydalina* were faster active than in *O. grattisimum and T. triangulare*

The results showed that *T. triangulare* was slower compared to *V. amygdalina* and *O. grattisimum*. This could because *T. triangulare* was a slower anthelmintic compared to *O. grattisimum* and *V. amygdalina* (Pessoa et al., 2002 and Nalule et al., 2013). And the presence of high water content can be responsible for this effect. The shrinking effect of *T. triangulare* might be due to presence of a specific compound in *T. triangulare* probably saponin (Adeola et al., 2015).

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