Anthelmintic activity of methanol extract of *Amaranthus caudatus* Linn.

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Abstract

*Amaranthus caudatus* Linn, traditionally used as vermifuge, so methanol extract of whole plant of *A. caudatus* was investigated for anthelmintic activity using earthworms (Pheretima posthuma). Various concentrations (10-100 mg/ml) of methanol extract were tested in the bioassay. Piperazine citrate (10 mg/ml) was used as reference standard drug whereas distilled water as control. Determination of paralysis time and death time of the worms were recorded. Extract exhibited significant dose dependent anthelmintic activity at 60, 80, 100 mg/ml. The result provides scientific validation for traditional use.

Key words: *Amaranthus caudatus* Linn, anthelmintic activity, Pheretima posthuma, Piperazine Citrate

Introduction

The World Health Organization estimates that a staggering two billion people harbor parasitic worm infections. Parasitic worms also infect livestock and crops, affecting food production with a resultant economic impact. Despite this prevalence of parasitic infections, the research on the anthelmintic drug is sparse. According to the WHO, only a few drugs are used in treatment of helminthes in humans. Anthelmintics from natural sources could play a key role in the treatment of these parasite infections. In view of this, attempts have been made to study the anthelmintic activity of traditional medicinal plants.

*A. caudatus* Linn, (Amaranthaceae), commonly known as “Peddathotakura” in Telugu. The amaranthus plants are spread throughout the world, growing under a wide range of climatic conditions and they are able to produce grains and leafy edible vegetables (Rastrelli et al., 1995). *A. caudatus* traditionally used in jaundice, amoebiasis, kidney diseases (Haile yineger et al., 2008; Vanila et al., 2008), as blood purifier, diuretic, abortifacient, vermifuge and astringent (Khare, 2007).

*A. caudatus* is reported for its antiatherosclerotic (Najmeh Kabiri et al., 2010), antinociceptive and antipyretic activities (Ashok Kumar et al., 2010). *A. caudatus* seeds showed cholesterol lowering, *in vitro* antioxidant and alpha amylase inhibition activities (Plate and Areas 2010: Filomena Conforti et al., 2005). The Amaranth seed oil is used as neutraceutical resource from Ecuadorian flora (Bruni et al., 2001). *A. caudatus* contains antimicrobial peptides (Broekaert et al., 1992), agglutinin (Thomas et al., 1997), triterpenoid saponins and ionol derived glycoside.
Preliminary phytochemical analysis showed the presence of carbohydrates, steroids, alkaloids, phenolic compounds, flavonoids, saponins and amino acids in methanol extract of *A. caudatus*. Some of the phytoconstituents may be responsible.

Methanol extract of *A. caudatus* showed dose dependent paralysis ranging from loss of motility to loss of response to external stimuli, which eventually progressed to death (Table 1). At 60, 80 and 100 mg/ml concentration shows paralysis at 19.21, 12.16 and 5.75 min and death at 27.7, 18.6 and 8.5 min. From the above results, it is concluded that methanol extract of *A. caudatus* showed significant anthelmintic activity when compared to standard piperazine (10 mg/ml).

Helminthic infections of the gastrointestinal tract of human beings and animals have been recognized to have adverse effect on health standards with a consequent lowering of resistance to other disease. In search of compounds with anthelmintic activity, a number of substances were screened using different species of worms, for example, earthworms, *Ascaris, Nippostrongylus*, and *Heterakis*, out of all these species, earthworms have been used widely for the initial evaluation of anthelmintic compounds *in vitro* because they resemble intestinal ‘worms’ in their reaction to anthelmintics and are easily available. It has been demonstrated that all anthelmintic are toxic to earthworms and a substance toxic to earthworms is worthy for investigation as an anthelmintic (Sollmann, 1918). Earthworms have the ability to move by ciliary movement. The outer layer of the earthworms is a mucilaginous layer and composed of complex polysaccharides. This layer being slimy enables the earthworm to move freely. Any damage to the mucopeolysaccharide membrane will expose the outer layer and this restricts its movement and can cause paralysis. This action may lead to the death of the worm by causing damage to the mucopeolysaccharide layer. This causes irritation leading to paralysis.

*A. caudatus* shows significant anthelmintic activity due to presence of polyphenolic compounds (Bate-Smith, 1962). The wormicidal activity of methanol extract against earthworms suggests that it is effective against parasitic infections of humans.

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References


