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Antifilarial activity of *Azadirachta indica* on cattle filarial parasite *Setaria cervi*

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Abstract

Alcohol and aqueous extracts of flowers of *Azadirachta indica* were tested in vitro for their potential antifilarial activity against whole worm, nerve muscle (n.m.) preparation and microfilariae of *Setaria cervi*. The effects of alcohol and aqueous extracts were similar in nature on the spontaneous movements of whole worm and nerve muscle preparation. On the whole worm, the response was characterized by initial increase in tone, rate and amplitude of contractions followed by reversible paralysis. The initial stimulant effect is likely to be due to irritant effect on the cuticle. Nerve muscle preparation responded to both extracts by inhibition of spontaneous movements followed by reversible paralysis; initial stimulation phase was absent. The inhibition was concentration related. Alcohol and aqueous extracts had almost similar lethal effect on the microfilariae of *S. cervi*, the LC_{50} being 15 and 18 ng/ml, respectively.

Keywords: *Azadirachta indica*; *Setaria cervi*; Antifilarial activity

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1. Introduction

Azadirachta indica (Meliaceae) A.Juss. (neem) is a large evergreen tree, 40 to 50 ft in height, common throughout the greater parts of India and Burma. Almost every part of this tree is used for medicinal purposes in India [1]. Leaves, roots, stem have been used as antimalarial [2], antioxidant [3], antifungal [4], antiinflammatory [5], antibacterial [6], antiviral [7] and for several other medicinal purposes in Ayurvedic system of medicine. The neem based common products like urea coated with nimin and aqueous extract of neem seeds showed nematocidal activity against *Meloidogyne incognite* (Kefoid and White) Chitwood [8,9]. Chemo-preventive potential of neem flowers on carcinogen-induced rat mammary and liver carcinogenesis has been reported [10].

Four prenylated flavanones possessing antimutagenic activity against heterocyclic amines in the *Salmonella typhimurium*, myricetin, quercetin and kaempferol, were isolated from the flowers of *A. indica* [11,12]. In the present paper, the results of an investigation of the efficacy of alcohol and aqueous extracts of the flowers of this plant concerning the antifilarial activity against *Setaria cervi* (Nematoda: Filarioideae) are presented.

2. Experimental

2.1. Plant material

The flowers of *A. indica*, collected from the survey of medicinal plants unit, Regional Research Institute of Unani Medicine, Aligarh (U.P.), India, were identified by Dr. Athar Ali Khan, Department of Botany, A.M.U., Aligarh (Voucher specimen number 19610).

2.2. Preparation of the extracts

Dried and powdered flowers of *A. indica* (500 g each) were extracted with distilled EtOH and distilled water, separately (yields: 2.35 and 2.45 g, respectively). The extracts were dissolved in 95% EtOH and distilled water before use as the addition of 0.2 to 0.5 ml vehicle (95% EtOH or distilled water) to the organ bath containing 20 ml Ringer's solution had no effect on worm motility.

2.3. Worms

S. cervi, a nematode parasite of the cattle water buffalo (*Bubalis bubalis* L.), resembles closely the human filarial worms in its response to drugs and can therefore be used for the screening of potential antifilarial agents [13]. *S. cervi* exhibits vigorous rhythmical movements, which can be recorded on a kymograph by suspending the worm in an isolated organ bath. The nerve muscle (n.m.) preparation of the worm exhibits similar movements [14].