



# IN VITRO STUDIES ON THE EFFECT OF *ALLIUM SATIVUM* (GARLIC) ON *DAMALINIA CAPRAE*

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## Abstract

Use of phytopesticides has many advantages over conventional chemical insecticides and is receiving worldwide attention as an alternative means of pest control. Preliminary studies were conducted to assess the lousicidal activity of alcoholic extracts of *Allium sativum* bulbs. In vitro study was carried out on the goat louse, *Damalinia caprae* using filter paper method. It was found that these crude extracts caused cent percent mortality of adult lice at a concentration of 100 mg/ml at 32 h post- exposure whereas at 50 mg/ml, the same mortality was observed at 48 h post-exposure. It is opined that further purification studies and in vivo trials are needed to ascertain the active ingredients responsible for the insecticidal properties of garlic juice extracts.

**Key words:-** *Allium sativum*, *Damalinia caprae*

Lice are permanent ectoparasites that constitute a very large group of more than three hundred species. The temperature and relative humidity prevailing in Kerala, coupled with a short life cycle enable lice to proliferate quickly, thus leading to high degree of infestation within a short span of time. *Damalinia caprae* is a biting louse belonging to the family Trichodectidae, infesting goats. Though the specific deleterious effect of *D. caprae* in goats in Kerala has not been studied in detail, it is thought to contribute to loss in production.

Topical insecticides remain the mainstay of control of lousiness in animals and this has led to several problems including the development of resistance, toxic manife

stations in animals, and concerns of residues in milk, meat as well as environment. The use of eco -friendly herbal plants individually or in combination may provide an alternative to conventional insecticides (Houghton, 1995). Ponnudurai *et al.* (2007) recorded 100 per cent reduction of bird louse treated with herbal formulation containing *Azadiracta indica*, *Cadmus deodara*, *Brassica compestris* and *Ocimum sanctum*. *Allium sativum* (garlic), a member of family *Alliaceae* has been shown to possess arthropocidal properties (Jarial, 2001 and Stjernberg and Berglund, 2000). Miticidal activity of garlic is also well established (Birrenkott *et al.*2000; Dwivedi and Sharma, 1986 and Magi *et al.*, 2006).In view of this, a preliminary study was designed to explore the *in vitro* lousicidal activity of *A. sativum* bulbs against *Damalinia caprae*.

## Materials and Methods

Bulbs of *A. sativum* (garlic) were procured from the local market and allowed to dry in the shade. The dried products were grated in an electric grinder. Ethanolic extracts were prepared from 200g of the grated material using the extraction technique described by Azhahianambi *et al.* (2004) with some modifications. Briefly, 200g of the gratings were macerated in one litre of rectified spirit in a closed container for 24 h with intermittent vigorous mixing. The supernatant was collected in large petridishes and the alcohol was allowed to evaporate. The residues obtained after evaporation were used for *in vitro* assays at different concentrations (5 per cent and 10 per cent) made with one per cent

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Tween 80(v/v) in aqueous medium. Filter paper method was adopted for testing the efficacy of *A.sativum* extracts as described by Nalamwar *et al.* (2009) for extract of *Acorus calamus* rhizomes. Different concentrations of crude *A. sativum* extract (50 mg/ml (AS 1) and 100 mg/ml (AS 2)) and 1 per cent Tween 80 (negative control) were poured on Whatman No.1 filter paper and allowed to dry. Dried filter papers were placed in different petridishes. Adult *Damalinea caprae* were collected from naturally infested goats. Twelve lice each were randomly selected and transferred to these petridishes, which were then maintained in a humidity chamber at a temperature of 28° C and relative humidity of 85 per cent. Observations related to the mortality of lice were taken at 2 h, 4h, 6h, 12h, 24 h, 32h and 48 h intervals.

### Results and Discussion

The result of *in vitro* treatment of *D. caprae* with ethanolic extracts of *A. sativum* bulbs showed that the lice survived AS1 and AS2 treatments up to 24 h. It was observed that AS1 treatment caused 50 per cent and 100 per cent mortality of lice after 32 h and 48 h of treatment respectively. AS2 treatment resulted in 100 per cent mortality at 32 h itself. All the lice in negative control were found to be alive even after 48 h of treatment. This seems to indicate that extracts from *A. sativum* bulbs possess certain lousicidal properties which were directly proportionate to the concentration. The results also concur with that of Kumar *et al.* (2011) who reported that mortality percentage of adult ticks increased as the concentration of herbal extracts increased and as the time interval progressed. Nchu *et al.* (2005), evaluating the toxic effects of extracts of *A. sativum* bulbs on adults of *Hyalomma* and *Rhipicephalus* sp. of ticks concluded that ethanolic extracts caused mortality of adult ticks after 24 h of exposure while dichloromethane extracts caused mortality in less than an hour. Nalamwar *et al.* (2009) inferred that *A.calamus* rhizomes contain certain constituents responsible for mortality of *D. caprae*. Preliminary investigations on lousicidal activity of *A. sativum* extracts are encouraging so that one more effective herbal lousicide can be used to control *D. caprae* infestation. However, further studies are needed to identify the active components in the garlic extract responsible for this activity.

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