SciMedCentral

Journal of Veterinary Medicine and Research

Short Communication

In vitro Testing of Licicidal Efficacy of *Allium sativum* (Garlic) Extract against Poultry Wing Louse, *Lipeurus caponis*

Nidhi Gupta*

Department of Zoology, Govt. Raza Postgraduate College, India

***Corresponding author**

Nidhi Gupta, Department of Zoology, Govt. Raza Postgraduate College, India

Submitted: 04 November 2025

Accepted: 21 April 2026

Published: 22 April 2026

ISSN: 2379-948X

Keywords

- *Allium sativum*
- Garlic
- *Gallus gallus domesticus*
- *Lipeurus caponis*
- Licicidal efficacy
- Poultry lice

Abstract

Preliminary *in vitro* trial was conducted to assess the licicidal potentials of extracts of *Allium sativum* against poultry wing louse, *Lipeurus caponis* through filter paper bioassay. The ethanolic extract of *A. saiivum* exhibited lousicidal properties directly proportional to concentration and exposure time. The percentage mortality caused by 15 μLL^{-1} concentration was recorded as 90% in 48 hrs. Hence, *A. sativum* extract should be further screened (for separation of fraction of active ingredient and its molecular characterization) to develop a potent herbal licicide (to replace organic pesticide). ANOVA (one way) test has confirmed that concentration statistically significant effect and the measured response increases with both time and concentration.

INTRODUCTION

Phthirapteran ectoparasites are known to cause economic loss (reduction of mortality and productivity) to poultry birds. Moreover, they are also capable of acting as reservoir and transmitter of pathogens among host birds [1]. Dependence on organic pesticides for their eradication has discouraged research on less toxic alternatives. But, growing environmental hazards have compelled further work the ecofriendly herbal formulations. During last two decades, selected workers have tried to assess the efficacy of extracts prepared from different plants [1-10], emphasized the insect repellent property of garlic. Hence, present report provides information on the licicidal potential of the extracts of *A. sativum,* on the basis of filter paper bioassay *in vitro* condition.

MATERIAL AND METHODS

Fresh bulbs of *A. sativum* were peeled off, washed (with distilled water and 1% sodium chloride), shade dried and crushed with electric grinder. The powdered material (200gm) was used to prepared ethanolic extract (as done by [11]. The residue obtained (after evaporation of alcohol was used to prepared three concentrations by using 1% Tween-80 v/u). The central (1% Tween 80 v/u) and three concentrations ($5\mu LL^{-1}$, 10 μLL^{-1} and $15\mu LL^{-1}$) of garlic extract were used to poured on filter paper (Whats man No. 1, dia. 9cm) kept in petridishes. Treated filter papers (in petridishes) were dried in shade. Fifty healthier looking poultry louse (*L. caponis*) collected from infested birds (housed in Lab) were transferred to each filter paper. Aforesaid petridishes were then placed in BOD incubator (at 35±1°C, 75-82%RH). The petridishes were examined under stereozoom trinocular microscope after 6,12,24 and 48 hrs. to record the mortality. Three replicates were tested for each treatment.

D/T × 100 = % Mortality

D = Dead lice after 48 Hrs.

T = Total lice (dead lice + Live lice)

RESULTS

The lowest concentration ($5\mu LL^{-1}$) of garlic extract caused 2% (01; n=50) mortality in 6 hrs. 20% (10; n=50) in 12 hrs, 40% (20; n=50) in 24 hrs. and 50% (25; n= 50) in 48 hrs. respectively (Figure 1). The mortality caused by 10uLL-1 concentration remained 8% (4; n=50) in 6 hrs. 24% (12; n=50) in 12 hrs, 50% (25; n=50) in 24 hrs. and 60% (30; n= 50) in 48 hrs. respectively (Figure 1). However,

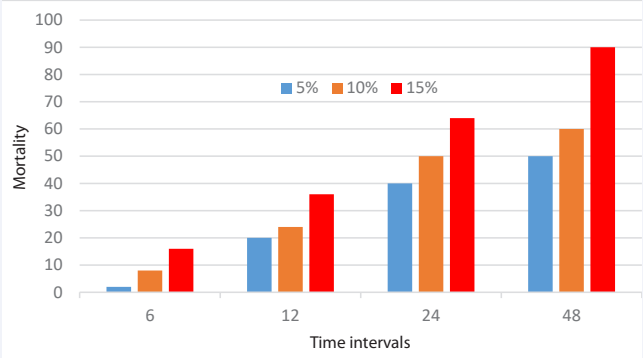

Figure 1 Showing the percentage mortality of poultry wing louse, *Lipeurus caponis* under the different concentrations of *Allium sativum* (garlic) extract in various time intervals.

the percentage mortality caused by 15µLL^{-1} concentration was recorded as 16% (8, n=50) in 6 hrs. 36% (18; n=50) in 12 hrs, 64% (32; n=50) in 24 hrs. and 90% (45; n= 50) in 48 hrs., respectively. Statistical analysis of results was performed using one way ANOVA test (F-statistic 39.5; p=0.00001). Since, the p value was far less then 0.05, there is a strong evidence that concentration consistently gives higher value, followed by 10/, 5/ and control. In other words, the measured response increases with both time and concentration. The difference in mortality of the four groups (with respect to concentration) were found significant at 0.05 level of significance. In other words, the mortality caused by Garlic to poultry louse *L. caponis* gradually increased with increasing concentration of extract and the exposure time.

DISCUSSION

The licicidal properties of the extracts of selected plants has been noted by some workers [2,5,12]. Aqueous extract of *Zanthoxylum alatum* exhibited strong anti-lice property [3]. Extracts prepared from *Mentha* arvensis also exhibited licicidal activity [2,4,9]. Extracts prepared from *Datura stramonium* exhibited limited licicidal property [8].Extracts of few plants (*Ziziphilus* maurutians and *Eucylyptus* camaldulensis) showed strong lice killing properties [10]. Found Garlic as potent insect repellent. Its licicidal properties against mammalian louse (Goat louse, *Damalinia* caprae) have been indicated by [6]. Hence, licicidal properties of the extract of *Alium sativum* against a poultry louse deserved investigation.

Present studies indicate that 0.15µ LL^{-1} concentratrion of the extract of *A. sativum* can cause 90% mortality, in 48 hrs, *in vitro* condition (filter paper bioassay). Normally, a herbal extract that shows more than 75% lethality against pest (*in vitro* test) deserves further testing and screening of its active ingredients responsible for insecticidal potential (followed by separation of fraction and molecular characterization.

ACKNOWLEDGMENT

The authors are thankful to the Principal, Govt. Raza P.G. College, and Rampur (U.P) for providing laboratory facilities, to Guru Jambheshwar University, Moradabad and the higher education dept. of U.P. Govt. for a funded research project (No. 46/2021/603/-4-(56)/2020 dated 30/03/2021).

REFERENCES

1. Clayton DH, Bush SE, Johnson KP. Coevolution of life on hosts: Investigating ecology and history. 2016; 1: 1-249.
2. Kumar S, Singh SK, Baslas RK, Ghildiyal JC, Saxena AK. Lousicidal properties of few aqueous plant extracts. 2002a; 79: 1136-1140.
3. Kumar S, Singh SK, Baslas RK, Ghildiyal JC, Saxena AK. Isolation and characterization of lousicide from the leaves of Zanthoxylum alatum (Family: Rutaceae). 2002b; 19: 137-140.
4. Khan V, Ahmad A, Gupta N, Saxena AK. Lousicidal properties of Mentha oil against tropical hen louse. 2008; 85: 323-324.
5. Kosalge SB, Fursule RA, Patel RC. Investigation of licicidal activity of some plants from Satpuda Hills. 2009; 1: 564-567
6. Lakshmanan B, Rajagopal R, Sreekarishnan R, Subramanian H. In vitro studies on the effect of Allium sativum (Garlic) on Damalinia caprae. 2013; 44: 61-62.
7. Al-musawi MM. Evaluation of Lousicidal Activity of Ziziphus mauritiana Alkaloids and Eucalyptus camaldulensis Terpenoids Leaves Extracts in Chickens: An In Vitro Study. 2017; 09: 1-9.
8. Rashmi A, Ahmad A, Saxena AK. Mortality caused by aqueous extract of the leaves of Datura stramineus to goat biting louse, Bovicola caprae (Phthiraptera). 2018; 10: 77-79.
9. Gupta N, Khan G, Kumar S. Evaluation of Lousicidal Property of Oil of Mentha arvensis against Poultry Fluff Louse, Goniocotes gallinae (Phthiraptera: Ischnocera). 2021; 98: 09-12.
10. Stjernberg L, Berglund J. Garlic as an insect repellent. 2000; 284: 1-3.
11. Azhahianambi P, Hariharan P, Punniamurthy N, Gomathinayagam S. Insecticidal property of leaves and seeds of sitaphal (Annona squamosa). 2004; 18: 55-57.
12. Lakshmanan B, Rajagopal R, Gleeja VL, Subramanian H. Comparative efficacy of certain plant extracts against Menopon gallinae and Lipeurus caponis. 2016; 04: 1-5.
13. Kumar A, Shukla R, Singh P, Singh AK, Dubey NK. Use of essential oil from Mentha arvensis L. to control storage moulds and insects in stored chickpea. 2009; 89: 2643-2649.