



**International Journal of Biology, Pharmacy  
and Allied Sciences (IJBPAS)**

*'A Bridge Between Laboratory and Reader'*

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**EVALUATION OF SOME INDIGENOUS PLANT EXTRACT FOR THE  
MANAGEMENT OF ONION THRIPS (*THRIPS TABACI*, THYSANOPTERA:  
THIRIPIDAE)**

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Received 20<sup>th</sup> Nov. 2016; Revised 26<sup>th</sup> Jan. 2017; Accepted 11<sup>th</sup> April 2017; Available online 1<sup>st</sup> Oct. 2017

**ABSTRACT**

Onion thrips (*Thrips tabaci* Lindeman), is one of the most serious pest in Pakistan. It causes severe economic losses due to its periodic occurrence and damage caused by sucking sap from plants. Some Plants extracted from certain plants have broad-spectrum insecticidal properties on soft-bodied insects therefore; they may be used as an alternative source for an integrated pest management. The study was conducted to evaluate the botanicals *Nicotiana tabacum*, *Azerchita indica*, *Acacacia nilotica*, *Citrus aurantiun* and *Cassia fistula*. The chemicals were tested under laboratory conditions to control the onion thrips. Six treatments with three replications were used to find the best results. Each treatment was replicated three times. Data was collected after 6, 12 and 24 hours at 25%, 50% and at 100% concentrations. The results showed that at 25% concentrations *Acacacia nilotica* showed very good results followed by *Azerchita indica*, *Nicotiana tabacum*, *Cassia fistula* and *Citrus aurantiun*. Similarly, at 50% again *Acacacia nilotica* showed highest mortality while *Cassia fistula* showed lowest mortality. At 100% *Acacacia nilotica* showed best results as compared to others extracts. It is concluded that *Azerchita indica*, *Eucalyptus globus*, *Acacacia nilotica*, *Citrus aurantiun* and *Cassia fistula* were

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significantly very effective against onion thrips under field condition and very operative components of Integrated Pest Management (IPM) practices in Pakistan.

**Keywords: Management, Onion, Plant Extract, thrips, IPM**

## INTRODUCTION

Onion (*Allium cepa* L.) is known to be the important condiments for daily household use. Basically it is the important crop in Pakistan. The pungency of onion is due to presence of some volatile natural oil called Allyl-propyle disulphide. Every year the worldwide production of onion is almost 25 million tones. The average yield of onion is 10.77 tons per hectare that is used for local consumption and for exporting purposes. Predominantly it is noticed that the glowing ratio of onion increases day by day specially in small farmers [1]. In Pakistan, the ratio of production of onion is 1138.2 thousand tones per year. This is also known to be the second valuable crop in vegetables. Presently, Pakistan is 7<sup>th</sup> largest producer of onion in world, the leading one is china followers include India [2]. It contains phosphorus, calcium and carbohydrates besides these also contain protein and vitamin C. In Pakistan, the production of vegetables is as much important for income and for food security. Agriculture is the fundamental unit of under developing country like Pakistan [3]. After sowing, during different stages of Onion crop are

hampered through different insect's pests. Onion thrips (*Thrips tabaci*) is most prominent and major pest of onion crop [4, 5]. Over the globe about 50% annual losses are observed by the attack of onion thrips [6]. This is an arthropod pest that attack on both greenish parts as well as on dry bulbs of onion. It attacks more or less 300 species of plants in different manners. In Kenya, almost 59% loss was caused by thrips on onion crop [7]. This pest is economically most important and cause loss specially in area that are under irrigation [8]. Thrips not only attack and damage onion crop but also responsible for the transmission of some viruses; One of them is topo viruses [9]. It is known to be the most dangerous disease caused by viruses. In case of thrips, if we are taking any control measure than that should be taken before maturing stage of crop. Thrips attack on onion and causes reduction in size of bulb and silvery appearance on the surface of leaves is also the symptom of the attack. Thrips have sucking type of mode of damage it sucks the sap by asymmetrical mouth parts and it rubs on the surface of leaves and take their food supplements. They reduce the photosynthetic ability of

plants and plant goes toward its death [9, 10]. An appropriate control tactic for such destructive pest is much important and most needed. In present trend mostly farmers totally relay on chemical control because it is effective and time saving control method. A disappointed thing is that these chemicals have side effects and deteriorates the quality and quantity of crop, these chemicals also have drastic effects on environment and as well as on health of human beings. The rising costs of pesticides is another reflecting problem for miniature farmers [11, 12]. These mentioned problems lead towards another control method which is use of botanical extracts for the better control of these destructive pests that is not only cost effective, reliable but also Eco friendly and secure for human health. Botanicals extracts are famous for their high fumigant properties. As in chemicals fumigants, phosphine is well known fumigant but modern study reveal that phosphine is not effective on insects as insects develop much resistance against it. Botanicals are use in the form of powder as well as liquid. Commonly used parts are seed, flowers and leaves of plants for this purpose. Mortality and repellency of insects directly depends upon toxic substances present in plant parts.

Their special type of smell repels insect's pests and sometime kills them.

#### **MATERIAL AND METHOD**

Experiment was conducted in entomology laboratory of institute of agriculture sciences, Punjab University Lahore.

#### **Preparation of plants extracts:**

Collection of leaves for preparation of extracts was done initially. Leaves of plant *Nicotiana tobacum*, *Azadirachta indica*, *Acacia nilotica*, *Citrus aurantium* and *Cassia fistula* were collected from different localities of Punjab university Lahore. Leaves after collection dried in shade for 7 days. Leaves were grinded in grinder machine prepared a fine powder, after grinding macerate the powder extract with methanol solution. 50 grams of each plant extract macerate in 400ml of methanol and placed in separate beakers on rotary shaker for 3 days at 120 rpm (revolution per minute) at low pressure and temperature. Afterwards filtered the media with the help of Whatman No.1 filter paper the filtrate again placed at rotary shaker to got crude plant extract the quantity drops downs and the solution become 10ml of each the last crude filtrate found is known to be the stock solution of each plant extract. Tightly covered the flask which containing the extracts. The dilution was done in 100ml of

methanol for all extract solution that took in crude form in order to get different concentrations i.e 25%, 75% and 100% while performed experiment.

#### **Collection of Thrips:**

Onion thrips were collected from fields of onion crop. Manual picking was done, collected strength of thrips. Collection was done few hours before starting experiment. Commonly field application was done but here we done lab experiment.

#### **Filter paper method:**

Evaluation of mortality of *Thrips tabaci* was determined by using filter paper method. Placed filter papers in petri plates total 1ml of solution with different concentrations of extracts applied on filter papers and allowed the filter papers to be dried for few minutes after application. Released 30 thrips in each plate and covered it with lid.

#### **Bio-assay for mortality:**

Mortality of insects observed after intervals of 6 hours of application, after 12 hours and after 24 hours. Found different mortality ratios in all plates. It was concluded from results by the use of abbot formula also statistically analyzed data by the use of ANOVA.

### **RESULTS**

In this study efficiency of methanolic extracts from five different plants species

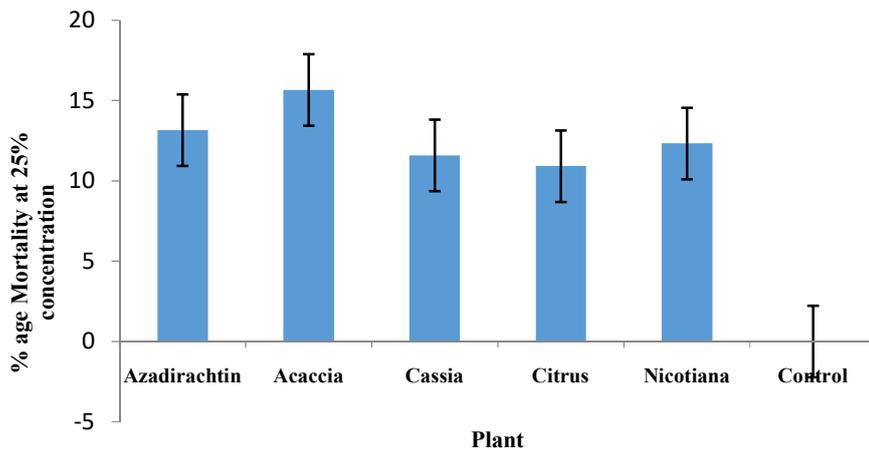
(*Azadirachtin*, *Acaccia nilotika*, *Cassia fistula*, *Citrus* and *Nicotiana tobaccum*) were evaluated against onion thrips. Mortality was the parameter of efficacy for these applied treatments. Three replicates of concentrations for each individual treatment at (25%, 50%, 100% and control) were given under complete randomized design (CRD). Results showed that all treatments were proved significantly effective in giving the mortality of onion thrips while no mortality was observed in control treatment. It was observed that at 25% concentration *Acaccia nilotika* was proved more significant in giving maximum mortality (15.667%) as compared to other applied botanicals followed by *Azadirachtin* (13.167%), *Nicotiana* (12.333 %), *Cassia* (11.583%) and *Citrus* (10.917%). Graph 1 representing percentage mortality of all treatments at 25% concentration is shown below. At 50 % concentration *Acaccia nilotika* was proved effective followed by *Azadirachtin*, *Nicotiana tobaccum*, *Citrus* and *Cassia fistula* while no mortality was observed in control. Graph 2 given below is revealing %age mortality at 50 % concentration. Maximum mortality and effectiveness of these all applied treatments was observed in 100% concentration and it is also shown below graphically in Graph 3.

The comparison mean representing mortality for each treatment is shown in below (Table 1). The overall results revealed that among applied treatments *Acaccia Nilotika* was more effective in giving maximum mortality at all concentrations viz (25%, 50% and 100%) and at all-time intervals followed by *Nicotiana tobaccum*, *Azadirachtin*, *Cassia fistula* and *Citrus*. It was also observed that

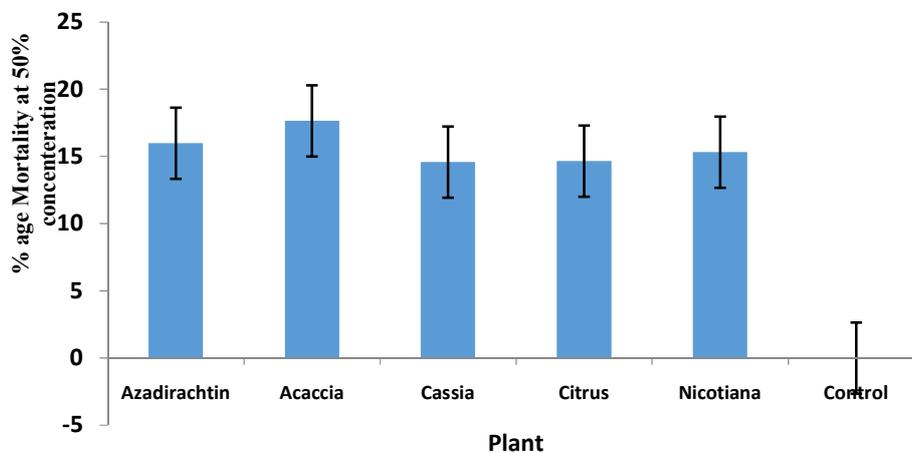
maximum mortality was at 100% concentration for all applied treatments as compared to 50% and 25% dilutions. This shows that mortality is dose and concentration dependent for each treatment as well. Mortality increases with increase in concentration they have directly proportional relation with each other.

Table 1: Representing mean mortality for all applied treatments at different concentrations

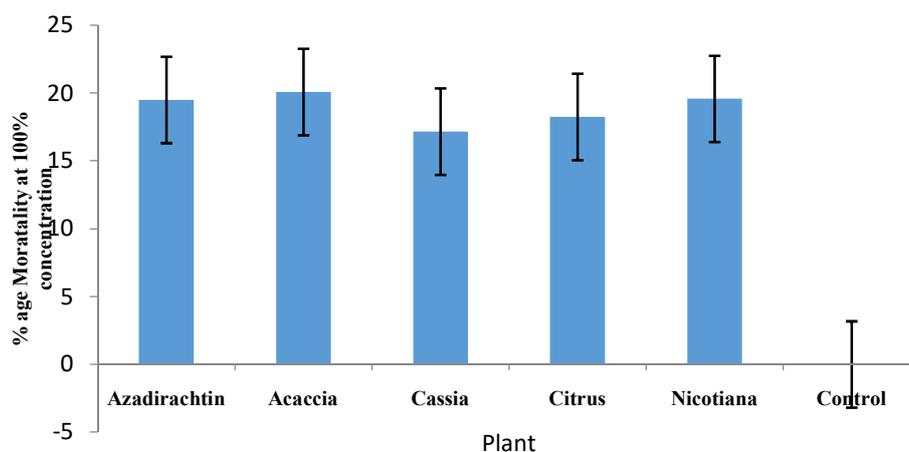
Treatments	Azadirachtin	Acaccia Nilotika	Cassia fistula	Citrus	Nicotiana tobaccum
T1 (100%)	19.5 a	20.083 a	17.167 a	18.25 a	19.583 a
T2 (50%)	16 ab	17.667 b	14.583 ab	14.667 b	15.333 ab
T3 (25%)	13.167 b	15.667 c	11.583 b	10.917 c	12.333 b
T4 control	0 c	0 d	0 c	0 d	0.833 c



Graph 1: Representing percentage mortality at 25% concentration



Graph 2: Showing percentage mortality at 50% concentration



Graph 3: Showing percentage mortality at 100% concentration

Results concluded that these plant materials have active material which have toxic effect and able to cause mortality against this devastating pest of edible crops. These findings also revealed that plant extracts can be used for a reliable, eco-friendly, cheap and in an alternate sustainable control program against economically important pests.

## DISCUSSION

Present study was carried out to check the effectiveness of different methanolic plant extracts against Onion Thrips. The findings proved that all applied botanicals were significant in giving mortality of Thrips at all applied concentrations and time intervals. Our findings proved the efficiency of plant extracts which is in positive relation with the findings of Reddy *et al*, [13] who determined the effectiveness of indigenous plant extracts such as Neem for Onion Thrips management under field conditions

in India. *Nicotiana tabacum* was proved exceptional in our findings which is confirmed by the findings of Lal and Verma [14] who found tobacco was effective in controlling Thrips to 65-75% as compared to control. Efficacy of tobacco biopesticides were evaluated by Solangi *et al*, [15] against sucking insects (whitefly, Aphid and Thrips) and desirable results were obtained which is in same line with our study. Neem extracts used from [16-18] were also proved handy in controlling thrips which is also confirming our findings. In some cases, Neem extracts are also used as harmful for farmers and reported same toxic towards beneficial and non-targets. Findings by Julie and Strak, [19] are contrary with our findings. Our study is a preliminary study of methanolic plant extracts against Onion Thrips. Effectiveness of botanicals is proved in this study but a lot of work is required to study about the active

ingredients (Bioactive agent), mode of action of these botanicals and their effect to non-targets is still debatable. Keeping in view their efficiency these bio products should be compensated and adjusted in a safe, healthy, cheap and for reliable control program of devastating pests.

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