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EFFICACY OF LEAF EXTRACT OF TAGETES ERECTA ON WILD DROSOPHILA MELANOGASTER

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ABSTRACT

Tagetes erecta popularly known as marigold, are grown as ornamental plant and thrive in varied agro climates. Tagetes erecta Leaf extract exphibit insecticidal activity. Tagetes erecta Leaf extract has shown to exhibited growth and development inhibitor effect on wild Drosophila melanogaster, which has been used as a model insect in the present investigation. Drosophila melanogaster has been used to observe the sub lethal effect of Leaf extract of Tagetes erecta. The Lc_{50} of Leaf extract to wind Drosophila melanogaster was 105.5 µl / 100 ml of food. Adult flies were fed 2 days on prescribed food treated with sub lethal concentration 10.55µl ($1/10^{th}$ of calculated Lc_{50}) of Leaf extract and allowed to fertilize for 3 days and to complete their pre developmental Stages. The leaf extact has reduced number of larvae and pupae, as compared to control set. The Leaf extract exhibits the toxicity against wild Drosophila melanogaster.

Key words: ***Growth inhibitor, Tagetes Leaf extract, wild Drosophila melanogaster.***

I. INTRODUCTION

Some 10,000 sps of the more then one million sps of insects are crop eating and of those approximately 700 sps world wide cause most of the insects damage to man,s crops in the field and storages. Indian economics mainly depend on the agriculture an for which fertilizers and high yielding seeds have continuously been used. So it become necessary to prevent this damage by employing various types of chemicals, which have provided desired result to some extent, while the outcome has been the onset of environmental problems. The large scale use of chemical pesticides in agriculture and public health has led to the other related adverse effect such as development of pesticide resistance of new pest population and health hazards. Presence of some pesticides is so wide spread that they from a real threat to environment where we live in (Mahrotra and Gujar, 1985).

The insect control, includes all measures that keep a check on feeding, reproduction an dispersal of insect, so as to lead either to their complete eradication or drastic suppression of population However, No control procedure about 100 percentage reduction in questioned pest population.

Now a days, in the chemical control of pests, synthetic organic pesticides dominate the scene. Extensive use of certain synthetic organic pesticide has often negative influence on environment and many cause as selection of resistant population of pest, or a change in the spectrum an density of the natural enemies. The residues of some

pesticides in food chains can be hazardous to human health. These and many other reasons force us to look for new alternatives for the protection of culture plants against pest, that would eliminate above maintained plants, which were developed during evolution as the components of natural defense against insect pests (Pavela.2004)

There is an urgent need to explore and utilize naturally occurring products for combating insect pests. Before using a new products in field, it is necessary to study its properties, effects on non-targets as well as targets species, environmental safety and other consideration with many aspects. Though the synthetic organic pesticides are in vogue yet the plant origin pesticides and their analogs have an upper hand. Keeping in mind these views and need of safe and effective pesticides turned our efforts to herbal products. In a search for better alternative, natural products are those products, which are obtained by natural entities. However, some plant products have shown promises for insect control even under field conditions.

The *Tagetes erecta* (Family, Compositae) has shown both larvicidal as well as adulticidal activity against mosquito (Perich et al., 1994) The herbal plant, *Tagetes erecta* which is used for controlling the insect pests having active components, which have been isolated from different parts of the plant.

The sub lethal effects of Leaf extract on wild *Drosophila melanogaster* has been assessed in various cross combinations to assess the extent of effectiveness of the extract in terms of hatchability and pupation. Wild fly has been used as a model insect in the present investigation because it possesses an abundance of the genetic variability, is a highly prolific and is a convenient organism in biological research particularly in genetic and toxicological studies. It is easy to handle and well understood. It is small insect with a short life cycle of 10 days at 25°C to 50% relative humidity. The present paper includes toxic response of *Drosophila melanogaster* to Leaf extract.

II. MATERIALS AND METHODS

Wild *Drosophila melanogaster* were reared in glass culture bottles of 100 ml of capacity and maintained under the laboratory conditions. Wild files were fed with mixture of distilled water, Agar-agar, corn flour, sugar, yeast, nepazine, propionic acid and 70% alcohol. New synthesized *Tagetes erecta* Leaf extract was extracted by hydrodistilation process.

The culture of wild fly and all experiments were conducted inside the B.O.D. incubator at a temp. of 25°C and 50% relative humidity. Adults flies were used for experimentation and were fully acclimatized to the laboratory conditions. For bioassay procedure, wild flies were divided into five sets, each set consisting of randomly selected 10 individual. The *Tagetes erecta* Leaf extract was prepared in acetone and serially diluted up to five cons. Levels i.e.1000, 500, 250, 125, and 62.50μl per 100ml of food respectively. Some amount of acetone was given to control set. The files were anaesthetized mildly with anaesthetic ether before putting inside the bottle such that these could be easily counted daily. The files were released in bottles containing the treated medium. Each of the bottles were then covered with sterilized cotton plug. A control set of 10 individuals was also released in bottles similarly. The mortality of flies were recorded for each sets after 48 hours. Moribund insect

were considered as dead the mortality data thus obtained was subjected to probit analysis (Finney 1971) to LC_{50} calculated values.

For the response of *Tagetes erecta* Leaf extract, as growth and development inhibitor experiment flie the prepared of *Drosophila melanogaster* was divide into four groups. Each Group consisting of two culture bottles were marked as :- (i) TM X UTF (ii) TM X TF (iii) UTM X TF (iv) UTM X UTF out of these treated bottles were given the $1/10^{th}$ concentration of calculated LC_{50} (105.5µl per 100ml of food), While untreated bottles received same amount diluents (acetone). The control set included UTM X UTF, which were run Separately for each of treated sets. The files were etherized for the separation of males and females flies. Either of saxes were sorted by hand lens and were gently transferred into the bottle after sorting the files as 10 males and 10 females. Flies were kept separately in Culture bottles that were marked previously and were kept under observation for 3 consecutive days. After 3 days the flies were crossed as :- (a) TF X UTM were placed in place food (b) TM X TF were placed in mixed with *Tagetes* Leaf extract food (c) TM X UTF were placed in plane food (d) UTF X UTM were placed in plane food.

All sets were kept inside B.O.D incubator and were to fertilize for 3 days. After three days while the files were discard. Each set was run in triplicate. The egg hatched into larvae, the third instar larvae came out from the food and stopped feeding, started crawling on the wall of bottles an counted. The larvae were transformed in the pupae. Pupation was considered to begain when the anterior spiracles were everted and the short brood shape of the pupa was formed.

All data obtained were subjected to statistical analysis. The statistical calculations were based on biological statistical formula given by fisher and Yates (1963) Anova Followed by D.M.R.T. was used to determine significance.(Bliss 1970, Gad 1999) Anova of toxicity of *tagetes erecta* Leaf extract on wild *Drosophila melanogaster.*

III. RESULT AND DISCUSION

Result of ANOVA of toxicity of leaf extract of *Tagetes erecta* on the wild *Drosophila melanogaster* In Various cross combination observation in hatchability and pupation. Wild flies were recorded after leaf extract intoxication at sublethal effect.

In various cross combination, hatchability was reduced after treatment with *Tagetes* Leaf extract, whereas more reduction in number of larvae were observed in those cross combinations, where both sexes have been treated in the present study, higher mortalities have also been observed during hatchability of larvae.(Table-1)

A reduction in number of larvae may possibly be due to the mortality of larvae at the time of moulting because some larval abnormalities have been observed in treated sets which suggest that *Tagetes* Leaf extract can like a chitin synthesis inhibitor or like insect growth regulator. The decrease in number of larvae may possibly be due to swelling at the anal papillae in larval bodies, suggesting possible interruption of osmotic and ionic regulation (Clement,1992). Some larvae that moulted successfully died owing to failure of sclerotization. The decreased

number of larvae is also an outcome of the embryonic mortality just before parturition and failure of ecdysis appear to be a major cause of inappropriate adult reproduction (Tang et al. 2001)

Reduction in number of larvae may possibly be due to the Leaf extract concentration, easy penetration through delicate covering like chorion and vetellion mambranes so the eggs are not converted into the larvae (Dwivedi and Garg 2003).

Table –1

ANOVA Followed by Duncan's multiple range test for comparing hatchability of larvae in various cross combinations of Drosophila melanogaster following treatment of Tagetes leaf extract

Replication	UTMxUTFC	UTFxTM T_1	UTMxTF T_2	TMxTF T_3
1	115	90	72	60
2	130	120	90	74
3	136	109	95	82
Total	$\sum C=381$	$\sum T_1=301$	$\sum T_2=257$	$\sum T_3=216$

$\bar{X}$= C=127 T_1=100.33 T_2=85.66 T_3=72

Table –2

ANOVA Followed by Duncan's multiple range test for comparing Pupation in various cross combinations of Drosophila melanogaster following treatment of Tagetes leaf extract

Replication	UTMxUTFC	UTFxTM T_1	UTMxTF T_2	TMxTF T_3
1	110	78	60	52
2	123	90	80	65
3	130	97	86	72
Total	$\sum C=363$	$\sum T_1=265$	$\sum T_2=226$	$\sum T_3=189$

$\bar{X}$= C=121 T_1=88.33 T_2=75.33 T_3=63

In Various cross combinations, pupation has been observed to be decreased in all treated sets. However more reduction in number of pupae was observed in those cross combination where both saxes were treated as comaped to control set (Table-2) and gain reveled who support by Saxena et al. (1993). The decrease in number of pupae may possibly be due to the death during moulting of larvae into pupae. In the present study some deformed pupae have also been observed which in turn resulted in the reduction of pupal count. The present findings are in affirmation to (Saxena and Srivastava 2002).

Further, the reduction of pupae may possibly be due to the failure of sclerotization after moulting. This Suggests that extract interferes with the hormonal control of moulting and possibly due to eclosion with increased concentrations. The observed pupal deformities may be the cause during moulting of larvae into pupae (Sagar et al. 1998).

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