

To assess properties of Contrafeedant® under the brand name Onteem® in comparison with Market Standard Solo Azadirachtin formulation against *Spodoptera litura*

Mr. Keshav Anand, Mr. Uday Anand, Mr. Shivraj Anand, Mr. Sandeep Datta, Dr. Mona Joshi, Miss Nidhi Kumari and Mr. Durgesh Kumar Chaudhary

Parijat Industries (India) Pvt. Ltd, M-77, M-Block Market, Greater Kailash Part-II, New Delhi-110048 (India)

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Abstract- The aim of the present study is to depict the properties of Contrafeedant® formulation under the brand name Onteem®. This when applied on the plants, it distastes the insects from feeding on crop, make uncomfortable to oviposit and make insects unstable to hide in the plant canopy to get exposed to insecticides application. This can be integrated and used with chemical insect control, which can help & manage the insect population under economic threshold level of attack involving the good agricultural practices.

Index Terms- Contrafeedant, Azadirachtin, Micro emulsion formulation, non-ionic silicon polyether surfactant, *Spodoptera litura*

I. INTRODUCTION

India is primarily an agricultural driven country, because more than 60 percent of India's population depends upon agriculture and its allied activities for their source of livelihood. The increase in food production and food security with the ever-growing population is becoming very important in the present times. The changing climatic conditions, the new invasive insect attacks, disease epidemics and health hazards linked to pesticide usage have led the scientific community in search of sustainable, biological and green solutions for managing the pest populations. The current approach toward pest management is to combat the pest with an integrated approach. Thereby all methods of Integrated pest management are deployed to manage the pest population in a way that it does not easily develop resistance to the control measures. The below research is using one such component of Integrated pest management and focuses on the use of Contrafeedant® (Onteem®) to manage the insects on crops making them vulnerable to better control under integrated pest control approach.

II. EXPERIMENTATION

2.1 Material and Method

3rd instar larvae of *Spodoptera litura* were selected for this experiment. The experiment was conducted using 3 treatments

with 4 replications each. The selected larvae were kept in starvation for 12 hours. Market standard Azadirachtin was compared with Contrafeedant® (Onteem®). The Azadirachtin was used at the dose of 2 ml/Lit and Contrafeedant® (Onteem®) was used at the dose of 3 ml /Lit, an untreated control was also kept for comparison. The experiment was conducted via two methods.

1. Spray Method

In this method the, the test insects along with fresh castor leaves for feeding were sprayed with the stock solution Contrafeedant® (Onteem®) and Azadirachtin separately so as to make them come in direct contact with the molecules separately. Treated items were then transferred to magenta boxes.

2. Leaf Dip Method

The stock solution were made using the doses as mentioned in the treatment details. Freshly plucked leaves of castor were washed properly and then dipped in the respective solution for 5 – 10 min and allowed to shade dry for a while. They were then kept in Magenta boxes and 5 larvae were released in each of the boxes to assess the contrafeedant properties exhibited by the test sample.

Observations were taken at 6, 12 and 24, 48 and 72 hours after application.

2.2 Contrafeedant® (Onteem®) formulation comprises Azadirachtin along with calibrated amount of low molecular weight non-ionic silicon polyether surfactant, to form a more stable compound quickly enters in plant system induce insecticidal and distasteful properties in the plant system making insect attack significantly unstable.

When this formulation is diluted in water for application, then formed diluted formulation, comprises of multiple components, resulting to a solution, which is a micro-emulsion, and/or nano-suspension. These are advantageous ecofriendly formulations for delivering and performing chemical compounds effectively to the target as well as desired environment (e.g., crops, soil).

III. OBSERVATIONS

Table 3.1: Observation of Spray Method treatment

Treatment	(%) Percent Feeding				
	Spray Method				
	6 Hrs.	12 Hrs.	24 Hrs.	48 Hrs.	72 Hrs.
Contrafeedant® (Onteem®) @ 3 ml /Lit	8	12	25	40	55
Azadirachtin @ 2 ml/Lit	10	12	28	45	58
Control	35	45	85	95	100



Table 3.2: Observation of Leaf Dip Method treatment

Treatment	(%) Percent Feeding				
	Leaf Dip Method				
	6 Hrs.	12 Hrs.	24 Hrs.	48 Hrs.	72 Hrs.
Contrafeedant® (Onteem®) @ 3 ml /Lit	5	15	20	38	50
Azadirachtin @ 2 ml/Lit	8	18	25	44	59
Control	35	45	85	95	100



IV. RESULT AND DISCUSSION

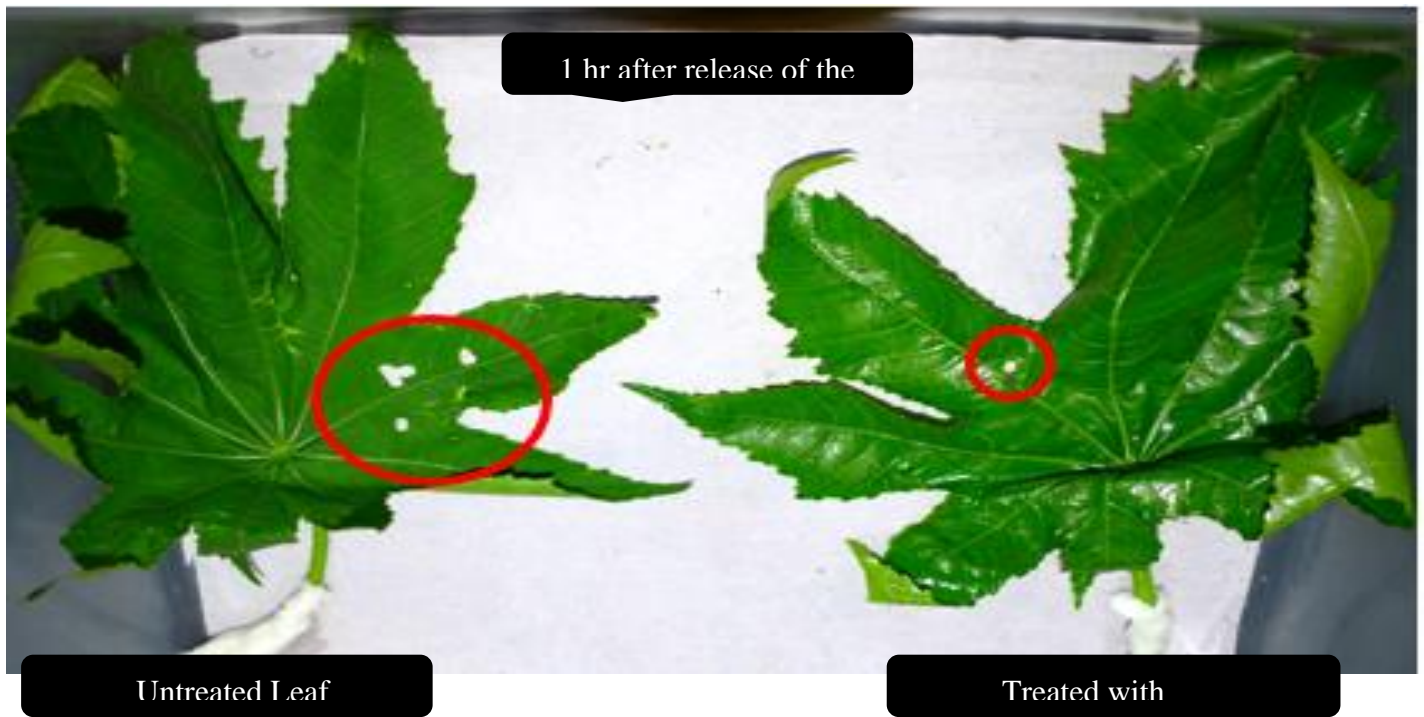
Study on Effect of Contrafeedant®(Onteem®) on Host Preference:



Spodoptera litura
larvae feeding on

Spodoptera feeding on castor leaves

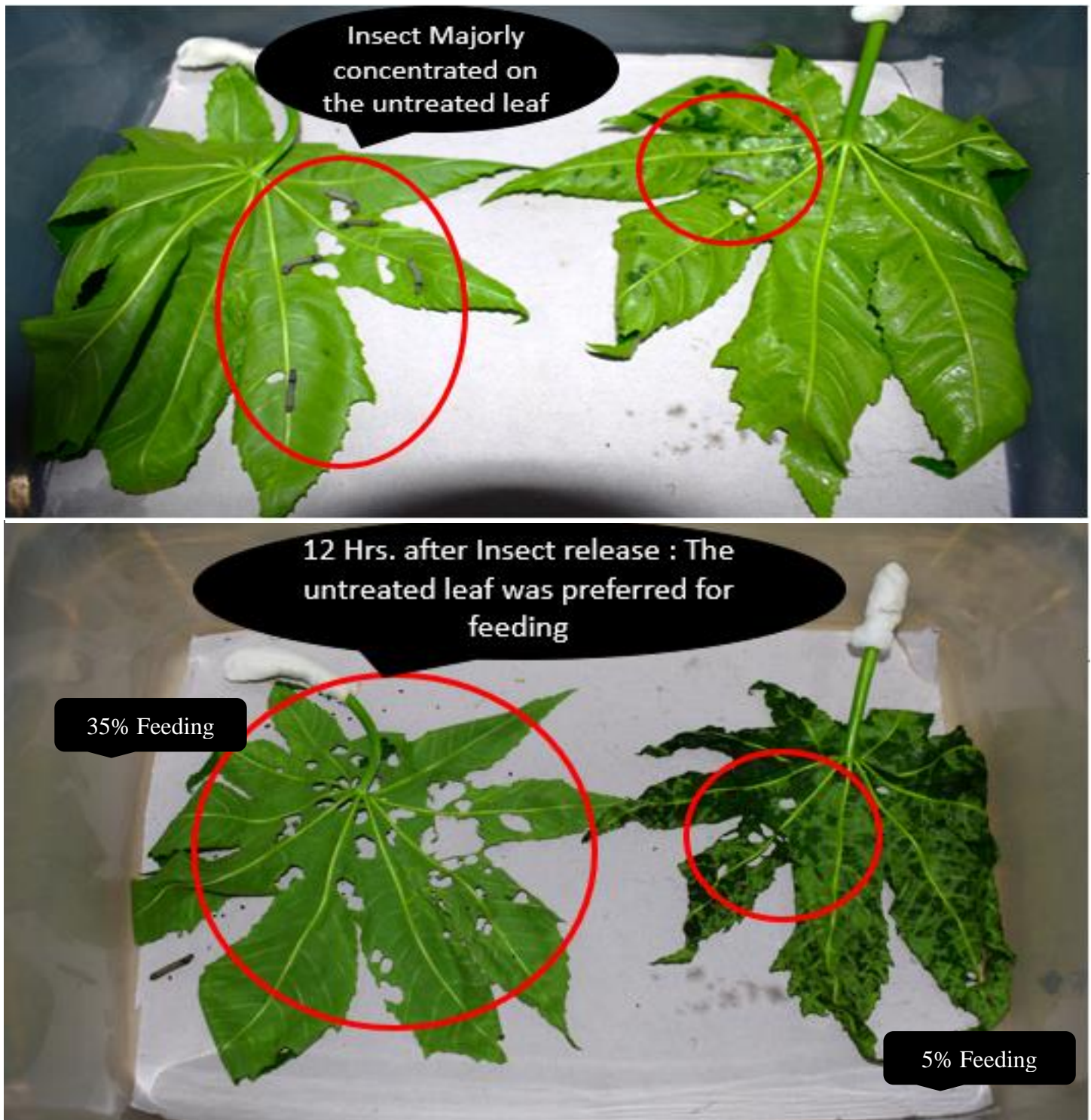
A study was also taken to Check the effect of the test sample on the eating preference of *Spodoptera litura*. For this a small experiment was set up, the experimental unit comprised of a leaf treated with **Contrafeedant**® (**Onteem**®) and the other leaf, fresh and untreated. 10 insects were released in each Experiment unit. The unit was then checked after 1hr, 6hrs, 12 hrs and 24 hrs.



1 hr after release of the

Untreated Leaf

Treated with



V. CONCLUSIONS

72 hrs after the experiment it was noticed, in all the treatments the maximum feeding to the tune of 100% was found in case of control. In case of Spray method, the maximum percent feeding observed after 72hrs of application was 55% in **Contrafeedant® (Ontem®)** treated and Azadirachtin treated 58% respectively.

The results were similar in case of the leaf dip method as well. The percent feeding observed after 72 hrs of application was 50% in case of Contrafeedant® (**Ontem®**) treated and 59% in Azadirachtin treated.

The host preferential study is also of the view that when given a choice the insect majorly concentrated feeding on the untreated leaf, contrary to the treated one. The untreated leaf showed 35% Feeding on untreated leaves as compared to only 5% feeding in the treated leaf.

All the insects used for the study were reared separately and assessed for any kind of morphological changes that may result due to exposure with the **Contrafeedant® (Ontem®)**. It was observed that the insect that came in contact with the **Contrafeedant® (Ontem®)** at recommended doses showed some significant morphological changes, such as abnormal morphology, delayed oviposition and emergence from pupae. Another significant observation was, the rate of oviposition was also drastically reduced. Thus, **Contrafeedant® (Ontem®)** in integration with chemical control can help manage the insect population involving the good agricultural practices.

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AUTHORS

First Author – Mr. Keshav Anand, email address: keshav.anand@parijat.in

Second Author – Mr. Uday Anand, email address: uday.anand@parijat.in

Third Author – Mr. Shivraj Anand, email address: shivraj.anand@parijat.in

Fourth Author- Mr. Sandeep Datta, email address: sandeep.d@parijat.in

Fifth Author- Dr. Mona Joshi, email address: mona.j@parijat.in

Sixth Author-Miss Nidhi Kumari, email address: nidhi.k@parijat.in

Seventh Author- Mr. Durgesh Kumar Chaudhary, email address: durgesh.c@parijat.in

Correspondence Author – Mr. Durgesh Kumar Chaudhary, email address: durgesh.c@parijat.in, contact number: 9873663419

Correspondence Author – Mr. Sandeep Datta, email address: sandeep.d@parijat.in, contact number: 9819764568