

Pesticidal Activity of Environment friendly agricultural materials (EFAMs)

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Key words: EFAM, pest, acaricidal activity, insecticidal activity

Abstract

Environment friendly agricultural material products (EFAMs) in current market were evaluated for their insecticidal or acaricidal activities. EFAMs were evaluated against *Tetranychus urticae*, *Plutella xylostella*, *Myzus persicae* and *Nilaparvata lugens* in spray method. Several EFAMs indicated high control value in spray method. Hatchability of *T. urticae* was relatively high after EFAM treatment. Some materials show high insecticidal activities against *P. xylostella* larvae but not against eggs. Few materials showed more than 80% insecticidal activities against *M. persicae* and *N. lugens*. The control value of more than half the materials for pest control was lower than 60%. EFAMs containing *S. flavescens*, neem oil and Rape showed higher control value

Introduction

Pest management is very important in organic agriculture but effective methods are not enough in organic farming. So, many organic farmers in Korea often use commercial Environment friendly agricultural materials (EFAMs). But the effect and function of EFAMs are not clear. In this study, EFAMs in current market were evaluated for their insecticidal or acaricidal activities.

Materials and methods

We procured EFAMs commercially available in Korean market and surveyed the raw materials of EFAMs. Pesticidal activity of EFAMs was evaluated against major pests in organic farming. Adults of mite (*Tetranychus urticae*), adults of aphid (*Myzus persicae*), nymph of brown plant hopper (*Nilaparvata lugens*) and larvae of diamond back moth (*Plutella xylostella*) were used in this study. These insects and mites were reared and tested under controlled condition of 25 ± 1°C and 60% relative humidity. EFAMs were diluted at recommend concentration of each product and treatment of EFAMs on insect and mite was conducted by Spray method. Test of *N. lugens* was conducted on nursery paddy in test tube and tests of *P. xylostella* and *M. persicae* were conducted on Chinese cabbage leaf on petri dish. 10 insects were used in each replicate. Test of *T. urticae* was conducted in kidney bean leaf disk on petri dish and 10 adults were placed onto each leaf disk. All treatments were triplicated.

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Table 1. Active materials in IEFAM (Insecticidal Environment Friendly Agricultural Material)

Materials	No. of products
<i>Sophora flavescens</i>	5
Silicic acid	1
Machine oil	1
<i>Neem oil</i>	7
Garlic	3
Wood vinegar	1
Pine needle	1
Rape	1
Tea	1
Chitosan	1
Yeast	1
B.T	2
Korean medicine	5
unknown	11

Table 2. Insecticidal activities of IEFAM against pests

Pests	No. of products				Total
	100 %	80-100%	60-80%	0-60%	
<i>T. urticae</i>	12	1	2	21	36
<i>M. persicae</i>	0	1	3	22	26
<i>P. xylostella</i>	11	1	3	22	37
<i>N. lugens</i>	4	3	4	22	31

Tab. 3: Insecticidal activities of IEFAMs against pests (%) in terms of materials

Materials	<i>T. urticae</i>	<i>M. persicae</i>	<i>P. xylostella</i>	<i>N. lugens</i>
<i>S. flavescens</i>	100.0	24.3	100.0	60.8
ilicic acid	12.0	13.5	20.6	6.7
Machine oil	-	-	100.0	26.7
Neem oil	57.9	21.7	63.1	52.7
Garlic	55.4	7.9	16.7	10.0
Wood vinegar	12.0	12.0	30.9	3.3
Pine needle	-	-	79.4	100.0
Rape	100.0	5.4	61.9	74.1
Tea	2.2	92.1	6.7	100.0
Chitosan	-	-	0	20.0
Yeast	44.6	-	20.6	13.3
BT	15.2	-	23.1	5.0
Korean medicine	31.0	32.4	16.2	55.8

Results and Discussion

Products made by *S. flavescens* (7) and Neem oil (5) are most common in EFAMs that are commercially available in Korean market. EFAMs were evaluated against *Tetranychus urticae*, *Plutella xylostella*, *Myzus persicae* and *Nilaparvata lugens* in spray method. 12 pesticidal EFAMs showed 100% acaricidal activity and 3 EFAMs indicated control value more than 60% by spray method. Hatchability of *T. urticae* was relatively low after EFAMs treatments. 11 products showed 100% insecticidal activity and 3 EFAMs indicated more than 60% control value against *P. xylostella* larvae. Eventhough the products showed high insecticidal activities against larvae, their activity were low against eggs. Few materials showed more than 80% insecticidal activities against *M. persicae* and *N. lugens*. EFAMs containing *S. flavescens*, neem oil and rape showed higher control value. More than half of EFAMs showed less than 60% of pesticidal activity against all insects and mites in this study. In many case, even some EFAMs showed high pesticidal activity against one pest, but were often ineffective to others. This result is assumed to be due to various ingredients of EFAMs which have different pesitcidal activities against different pests. Plant oils are normally effective to small sized pests such as mite. Microogarnisms like *B. thurengensis* are

insecticidal only to specific species. Some plant extracts such as *S. flavescens* have neurotoxin show pesticidal activity against broad range of pests

Conclusions

EFAMs available in Korean market showed broad pesticidal activity against *T. urticae*, *P. xylostella*, *M. persicae* and *N. lugens*. Most of EFAMs which have no mark as pesticide showed low insecticidal activity. EFAMs for pest control often has low control value depending on pests. So when organic farmers choose EFAMs they should select appropriate products according to target pest.

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