THE AGRI PUBLICATION
THE FUTURE OF AGRICULTURE
Grow With Every Page
e-Magazine for Agricultural Articles
Volume 01 | Issue 05 | October 2026
Available online at https://agripublication.com/
UDYAM REGISTERED NUMBER UDYAM-MP-06-0043239
©Agri Publication ISSN (Online): 3139-6127
Scan to Visit Our Website
Volume: 01 Issue No: 05

COMPARATIVE TOXICOLOGICAL EVALUATION OF NOVEL ACARICIDES

Article ID: AP-V01-I05-28

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Introduction

Acaricides are pesticides that kill members of the arachnid subclass *Acari*, which includes ticks and mites. Acaricides are used both in medicine and agriculture, although the desired selective toxicity differs between the two fields.

Acaricides such as Abamectin 01.90 % EC, Fenpyroximate 05 % EC, Spiromesifen 22.90 % SC, Propargite 57 % EC, Hexythiazox 05.45 % EC. Insecticides having acaricidal properties such as Abamectin 1.9 EC, Etoxazole 10% SC, Clorfenapyr 10% SC.

ISSN (Online): 3139-6127

1. Classification of acaricide on the basis of Mode of Action according to IRAC

Nerve & Muscle Targets

1. Acetylcholinesterase (AChE) inhibitors

Carbamates(methomyl)

2. GABA-gated chloride channel antagonists

Cyclodiene Organochlorines (Endosulfan).

3. Sodium channel modulators

Pyrethrins, Pyrethroids

4. Chloride channel activators

Avermectins, Milbemectin

5. Octopamine receptor agonists

Amitraz

Respiration Targets

1. Inhibitors of mitochondrial ATP Synthase

Diafenthiuron, Propargite.

2. Uncouplers of oxidative phosphorylation via disruption of the proton gradient

Chlorfenapyr

3. Mitochondrial complex III electron transport inhibitors

Acequinocyl, Fluacrypyrim

4. Mitochondrial complex I electron transport inhibitors

METI acaricides

5. Mitochondrial complex II electron transport inhibitors

Cyenopyrafen

Growth & Development Targets

1. Mite growth inhibitors

Clofentezine, Hexythiazox

Etoxazole

2. Inhibitors of chitin biosynthesis

Benzoylureas,FLUFENOXYRON

3. Inhibitors of lipid synthesis

Spirodiclofen

Unknown or uncertain MoA

Benzoximate, Bifenazate, Dicofol,

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Table no.1: Recommendation of different acaricide on different crops along with a.i and waiting period:

Crop	Common Name of the pest	Dosage/ha			Waiting Period(days)
		a.i (gm)	Formulation (gm/ml)	Dilution in Water (Liter)	
Chlorfenapyr 10 % SC					
Chilli	Mites (Polyphagotarsonemus latus)	75 – 100	750 –1000	500	05
Cyenopyrafen 30 % SC					
Apple	Mite	60 – 90	200 – 300	1000	15
Chilli	Mite	60 – 90	200 – 300	400 – 600	07
Cyflumetofen 20 % SC					
Tea	Red spider mite	125 – 150	625 – 750	400 – 500	05
Diafenthiuron 50 % WP					
Chilli	Mites	300	600	500 – 750	03
Citrus	Mites	1.0 g/l	2.0 g/l	2-3	30
Diafenthiuron 50 % WP					
Citrus	Mites	1.0 g/l	2.0 g/l	2-3	30

Table no.2: Comparative toxicities of different acaricides against *t. Urticae*. In potted bean plant:

Technical name	Common Name of the pest	Trade name	Manufacturer/suppliers	LC_{50} (ppm)
Abamectin 01.90 % EC	Red spider mites (*Tetranychus urticae*)	Dynamite 1.9% EC	Crystal Phosphate Ltd., Delhi	0.39
Fenpyroximate 05 % EC	Red spider mite	Pyromite 5% EC	Excel Crop Care Ltd., Gujarat	5.67

ISSN (Online): 3139-6127

Spiromesifen 22.90 % SC	Red spider mite	Oberon 22.9% SC	Bayer Crop Science Ltd., Mumbai	12.53
Propargite 57 % EC	Red spider mite	Omite 57% EC	Dhanuka, Agritech Ltd., Jammu and Kashmir	77.05

EC: emulsifiable concentrate; SC: suspension concentrate.

Mode of action of novel acaricides

1. PROPARGITE 57% EC

Mode Of Action: Propargite is a contact acaricide that controls motile stages of phytophagous (or plant feeding) mites

- Omite acts by direct contact, Omite Insecticide interferes with the key mite enzyme systems, which causes interruption of normal metabolism, respiration and electron transport and also inhibits ATP synthase in the nervous system of mites.

Trade name - **Comite®, Omite®**



Crop	Common Name of the pest	Dosage/ha			Waiting Period(days)
		a.i (gm)	Formulation (gm/ml)	Dilution in Water (Liter)	
Tea	Red spider mite	430-612	750-1250	400	7
Chilli	Mite	850	1500	500 – 625	07
Brinjal	Two spotted spidermite	570	1000	400	06

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2.Spiromesifen 22.90 % SC

Mode of Action: It inhibit acetyl coenzyme A carboxylase, the enzyme that catalyzes the first step in fatty acid biosynthesis. Important components of cell membranes, fatty acids are needed for growth and development. Exposure to this acaricide inhibits lipid biosynthesis, stopping the development.

trade name - Oberon®

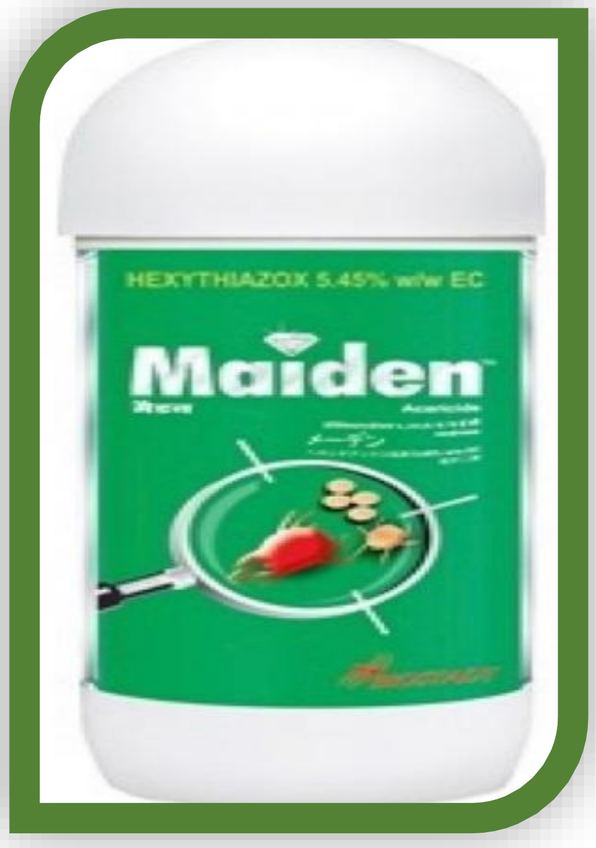


Crop	Common Name of the pest	Dosage/ha			Waiting Period(days)
		a.i (gm)	Formulation (gm/ml)	Dilution in Water (Liter)	
Cotton	Mite	144	600	500	10
Chilli	Chilli Yellow Mite	96	400	500 – 750	07
Tea	Red spider mite	96	400	400	07

3.Hexythiazox 05.45 % w/w EC

MODE OF ACTION - Non-systemic acaricide with contact and stomach action. It has ovicidal, larvicidal, and nymphicidal activity. Not active against adults, but eggs laid by treated females are non-viable.

Trade name - Maiden ®



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Crop	Common Name of the pest	Dosage/ha			Waiting Period(days)
		a.i (gm)	Formulation (gm/ml)	Dilution in Water (Liter)	
Tea	Scarlet mite, Red spider mite	15-25	300 – 500	400/ha	05
Chilli	Yellow mites	15 – 25	300 – 500	625/ha	03

4. Bifenazate 22.60 % SC

Mode of action - It is suggested to act as a GABA (gamma-aminobutyric acid) antagonist in the peripheral nervous system at the neuromuscular synapse in insects. It blocks the GABA-activated chloride channels, resulting in overexcitation of the peripheral nervous systems of susceptible pests. This mode of action is reported to be unique among acaricides.



Crop	Common Name of the pest	Dosage/ha			Waiting Period(days)
		a.i (gm)	Formulation (gm/ml)	Dilution in Water (Liter)	
Rose	Two Spotted Mite (*Tetranychus urticae*)	120	500	2000	-

ISSN (Online): 3139-6127

Conclusion

The last few years have seen the introduction of number of new classes of acaricide with novel and different modes of action, Acaricide research has uncovered several unrelated compounds that possess improved properties. Acaricides that are safe to beneficials, have low mammalian toxicity and short environmental persistence. Many of the new acaricides appear to affect lipid synthesis,ATP synthesis, having ovicidal activity and previously unknown targets affecting mite growth and development have been identified, offering new opportunities for mite control.

References

1. Brown DG, Siddens JK, Diehl RE and Wright DP Jr, Preparation of arylpyrrole pesticides, Brazilian Patent BR 8 803 788 (1989).
1. C h a r l e s 0. K n o w l e s , P e s t i c i d e S e l e c t i v i t y (Edited b y Josep h , C . Street), p . 155, 1971.
2. Grosscurt AC, ter Haar M, Jongsma B and Stoker A, PH 70–23: a new acaricide and insecticide interfering with chitin deposition. Pestic Sci 22:51–59 (1988).
3. IRAC Mode of Action Classification, Version 7.3, <http://www.irac-online.org/documents/moa-classification/?ext=pdf>, 2014 (accessed 27.10.14).
4. J. Khajehali, P. Van Nieuwenhuyse, P. Demaeght, L. Tirry, T. Van Leeuwen,Acaricide resistance and resistance mechanisms in Tetranychus urticae populations from rose greenhouses in the Netherlands, Pest Manag. Sci. 67(2011) 1424–1433.
5. Lovell JB, Wright DP Jr, Gard IE, Miller TP and Treacy MF, AC 303,630—an insecticide/acaricide from a novel class of chemistry, in Proc Brighton Crop Prot Conf—Pests Dis, BCPC, Farnham, Surrey, UK, pp 43–48 (1990).
6. R. Nauen, A. Elbert, A. McCaffery, R. Slater, T. Sparks, IRAC, Insecticide resistance and mode of action classification of insecticides, in: W. Kraemer, U. Schirmer, P. Jeschke (Eds), Modern Crop Protection Compounds, Wiley-VCH, Weinheim, Berlin, 2012, pp. 935–955.
7. Suzuki J, Ishida T, Toda K, Ikeda T, Tsukidate Y, Kikuchi Y and Ito Y, Preparation of 2,4-diphenyloxazolines and—thiazolines as ovicidal insecticides and acaricides, European Patent EP 345 775 (1989).