

INSECTICIDE MODE OF ACTION TABLE

Main mode of Action Group Primary Site of Action	Chemical sub-group of Exemplifying Active Constituent	Active Constituents	
1* Acetylcholinesterase (AChE) inhibitors Nerve action	1A Carbamates*	Bendiocarb Carbaryl Carbofuran Carbosulfan Methiocarb	Methomyl Oxamyl Pirimicarb Propoxur Thiodicarb
	1B Organophosphates*	Acephate Azamethiphos Cadusafos Chlorfenvinphos Chlorpyrifos Chlorpyrifos-methyl Diazinon Dichlorvos Dimethoate Ethion Fenamiphos Fenitrothion Fenthion	Malathion Mevinphos Omethoate Phorate Phosmet Pirimiphos-methyl Profenofos Prothiofos Temephos Terbufos Trichlorfon
2 GABA-gated chloride channel blockers Nerve action	2A Cyclodiene organochlorines	No registered active constituents.	
	2B Phenylpyrazoles (Fiproles)	Fipronil	
3 Sodium channel modulators Nerve action	3A Pyrethroids Pyrethrins	Allethrin Alpha-cypermethrin Beta-cyfluthrin Bifenthrin Bioallethrin Bioresmethrin Cyfluthrin Cypermethrin Cyphenothrin Deltamethrin Esbiothrin Esfenvalerate Fenvalerate	Flumethrin Gamma-cyhalothrin Imiprothrin Lambda-cyhalothrin Permethrin Prallethrin Pyrethrins Tau-fluvalinate Tetramethrin Transfluthrin Zeta-cypermethrin
	3B		
4 Nicotinic acetylcholine receptor (nAChR) competitive modulators Nerve action	4A Neonicotinoids	Acetamiprid Clothianidin Dinotefuran	Imidacloprid Thiacloprid Thiamethoxam
	4B Nicotine	No registered active constituents in Australia.	
	4C Sulfoximine	Sulfoxaflor	
	4D Butenolides	Flupyradifurone	

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5 Nicotinic Acetylcholine receptor (nAChR) allosteric modulators – Site I Nerve action	Spinosyns	Spinosad Spinetoram
6 Glutamate-gated Chloride (GluCl) channel allosteric modulators Nerve action	Avermectins Milbemycins	Abamectin Emamectin benzoate Milbemectin
7 Juvenile hormone mimics Growth regulation	7A Juvenile hormone analogues	Methoprene
	7B Fenoxycarb	Fenoxycarb
	7C Pyriproxyfen	Pyriproxyfen
8 Miscellaneous non-specific (multi-site) inhibitors	8A Alkyl halides	Methyl bromide
	8B Chloropicrin	Chloropicrin
	8C Fluorides	Sulfuryl fluoride
9 Chordotonal organ TRPV channel modulators Nerve action	9B Pyridine azomethine derivatives	Pymetrozine
	9D Pyropenes	Afidopyropen
10 Mite growth inhibitors affecting CHS1 Growth regulation	10A Clofentezine Hexythiazox	Clofentezine Hexythiazox
	10B Etoxazole	Etoxazole
11 Microbial disrupters of insect midgut membranes (includes transgenic crops expressing <i>Bacillus thuringiensis</i> toxins)	11A <i>Bacillus thuringiensis</i> and the insecticidal proteins they produce	<i>Bacillus thuringiensis</i> subsp. <i>israelensis</i> <i>B. thuringiensis</i> subsp. <i>aizawai</i> <i>B. thuringiensis</i> subsp. <i>kurstaki</i> <i>B. thuringiensis</i> subsp. <i>tenebrionis</i> <i>B. thuringiensis</i> crop proteins: Cry1Ac Cry2Ab Cry1F Vip3A
	11B <i>Bacillus sphaericus</i> and the insecticidal proteins they produce	<i>Bacillus sphaericus</i>
12 Inhibitors of mitochondrial ATP synthase Energy metabolism	12A Diafenthiuron	Diafenthiuron
	12B Organotin miticides	Fenbutatin oxide

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	12C Propargite	Propargite	
	12D Tetradifon	Tetradifon	
13 Uncoupler of oxidative phosphorylation via disruption of the proton gradient Energy metabolism	Pyrroles	Chlorfenapyr	
14 Nicotinic acetylcholine receptor (nAChR) channel blockers Nerve action	Nereistoxin analogues	<i>No registered active constituents in Australia.</i>	
15 Inhibitors of chitin biosynthesis affecting CHS1 Growth regulation	Benzoylureas	Bistrifluron Chlorfluazuron Diflubenzuron Flufenoxuron	Hexaflumuron Lufenuron Novaluron Triflumuron
16 Inhibitors of chitin biosynthesis, type 1 Growth regulation	Buprofezin	Buprofezin	
17 Moulting disrupter, Dipteran Growth regulation	Cyromazine	Cyromazine	
18 Ecdysone receptor agonists Growth regulation	Diacylhydrazines	Methoxyfenozide Tebufenozide	
19 Octopamine receptor agonists Nerve action	Amitraz	Amitraz	
20 Mitochondrial complex III electron transport inhibitors Qo site Energy metabolism	20A Hydramethylnon	Hydramethylnon	
	20B Acequinocyl	Acequinocyl	
	20C	<i>No registered active constituents in Australia.</i>	
	20D Bifenazate	Bifenazate	
21 Mitochondrial complex I electron transport inhibitors Energy metabolism	21A METI acaricides and insecticides	Fenpyroximate Pyridaben	Tebufenpyrad
	21B Rotenone	Rotenone (Derris)	
22 Voltage-dependent sodium channel blockers	22A Oxadiazines	Indoxacarb	
	22B	Metaflumizone	

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Main mode of Action Group Primary Site of Action	Chemical sub-group of Exemplifying Active Constituent	Active Constituents	
Nerve action	Semicarbazones		
23 Inhibitors of acetyl-CoA carboxylase Lipid synthesis, growth regulation	Tetronic and Tetramic acid derivatives	Spirotetramat Spiromesifen	
24 Mitochondrial complex IV electron transport inhibitors Energy metabolism	24A Phosphides	Phosphine Aluminium phosphide Magnesium phosphide	
	24B Cyanides	<i>No registered active constituents in Australia.</i>	
25 Mitochondrial complex II electron transport inhibitors Energy metabolism	25A Beta-ketonitrile derivatives	Cyflumetofen	
	25B Carboxanilides	<i>No registered active constituents in Australia.</i>	
28 Ryanodine receptor modulators Nerve and muscle action	Diamides	Chlorantraniliprole Cyantraniliprole Cyclaniliprole	Flubendiamide Tetraniliprole
29 Chordotonal organ nicotinamidase inhibitors Nerve action	Flonicamid	Flonicamid	
30 GABA-gated chloride channel allosteric modulators Nerve action	Meta-diamides Isoxazolines	Broflanilide Isocycloseram	
31 Baculoviruses Host-specific occluded pathogenic viruses (Midgut epithelial columnar cell membrane target site – undefined)	Granuloviruses (GVs)	<i>Cydia pomonella</i> granulosus virus strain V22	
	Nucleopolyhedroviruses (NPVs)	Polyhedral occlusion bodies of the NPV of <i>Helicoverpa zea</i> or <i>H. armigera</i>	
32 Nicotinic acetylcholine receptor (nAChR) allosteric modulators - Site II Nerve action	GS-omega/kappa HXTX-Hv1a peptide	<i>No registered active constituents in Australia.</i>	
33 Calcium-activated potassium channel (KCA2) modulators Nerve action	Acynonapyr	<i>No registered active constituents in Australia.</i>	
34 Mitochondrial Complex III transport inhibitors – Qi site Energy metabolism	Flometoquin	<i>No registered active constituents in Australia.</i>	

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36 Chordotonal organ modulators – undefined target site Nerve action	Pyridazine pyrazolecarboxamides	Dimpropyridaz
UN Compounds of unknown or uncertain mode of action (MoA)²	Azadirachtin	Azadirachtin
	<i>Clitoria ternatea</i> extract	<i>Clitoria ternatea</i> extract
	Dicofol	Dicofol
	Lime sulphur	Lime sulphur
	Sulphur	Sulphur
UNE (Botanical essence including extracts and unrefined oils)	Garlic extract and garlic oil Botanical oils	Garlic extract and garlic oil Orange oil Tea tree oil Eucalyptus oil Emulsifiable botanical oil
UNF Fungal agents of unknown or uncertain mode of action (MoA) (Target protein responsible for biological activity is unknown, or uncharacterized)		<i>Beauveria bassiana</i> strains
UNM Non-specific mechanical and physical disruptors		Diatomaceous earth Calcined kaolin Mineral oil Paraffinic oils Petroleum oil

*All members of the class may not be cross resistant.

² A compound with an unknown or controversial mode of action or an unknown mode of toxicity will be held in Group UN until evidence becomes available to enable that compound to be assigned to a more appropriate mode of action group.

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