



BIOVECTROL™ 612 EC

BIOVECTROL™ 612EC belongs to a series of environmentally friendly insecticidal formulations based on a unique and extremely safe active ingredient known as **Etofenprox®¹**, coupled with a proprietary blend of natural botanical extracts as synergist, for effective crop protection and growth enhancement.

BIOVECTROL™ 612EC series has high insecticidal activities, which provide very quick killing action against a broad spectrum of crop insect pests, including lepidoptera, hemiptera, coleoptera, diptera and orthoptera, and yet has remarkably weak toxicity to mammals.

BIOVECTROL™ 612EC series is also an “insect control agent” with multiple modes of biological activities, such as repellency, antifeedant properties and insect growth regulation effects, etc for crop protection in addition to its insecticidal activities. Furthermore, its anti-fungal, anti-viral and anti-bacterial properties protect crops against infection and therefore enhance plant development.

BIOVECTROL™ 612EC series is both biodegradable and photodegradable; long term and repeated applications will not pose any environmental pollution and will not leave harmful residues in crops.



FEATURES

➤ **RAPID KNOCKDOWN, BROAD SPECTRUM & PERSISTENT PROTECTION**

BIOVECTROL™ 612EC series has high, broad spectrum, insecticidal activity and provides very quick killing action against various insect pests including *Lepidoptera*, *Hemiptera*, *Coleoptera*, *Diptera* and *Orthoptera* with persistent protection.

➤ **LOW IMPACT TO NATURAL ENEMIES**

BIOVECTROL™ 612EC series is practically harmless to honeybees, earthworms and certain predator spiders, etc under normal outdoor applications.

➤ **NON PHYTOTOXIC**

No phytotoxicity is observed on most crops at the recommended dosages.

➤ **BIOLOGICAL ACTIVITIES AS INSECT CONTROL AGENT**

• **REPELLENCY**

BIOVECTROL™ 612EC treated leaf surfaces are less preferred by insect pests for feeding, colonization and reproduction due to its behavior-altering feature.

• **ANTIFEEDANT ACTIVITY**

BIOVECTROL™ 612EC stimulates deterrent neurons and inhibits attractant neurons of insect and thus suppresses insect feeding. It also affects insects' digestive systems, leading to alteration in feeding behavior. Furthermore, it inhibits the secretion of insect digestive enzymes – thus disturbing digestion, absorption and metabolism.



- **INSECT GROWTH REGULATION (IGR) EFFECTS**

BIOVECTROL™ 612EC has IGR effect – one of the strongest and predominant impact on immature insect pests. It disrupts molting hormone secretion and retards insect growth. IGR effects during the immature stages cause growth irregularities, resulting in the prevention of larvae growth, pupation and adult emergence.

- **REPRODUCTION SUPPRESSION**

BIOVECTROL™ 612EC significantly delays oviposition and cause a reduction in insect egg production, thus impairing reproduction ability of insect pests.

- **INSECT FITNESS DISRUPTION**

BIOVECTROL™ 612EC exhibits complex effects involving antifeedant, digestion, growth, reproductive disruption and other physiological impacts make insects weak, leading to natural mortality or predisposes them to insecticides, biological and beneficials in an agro-ecocsystem.

- **OVIPOSITION DETERRENCE**

BIOVECTROL™ 612EC treated plant surfaces are less preferred by insect pests for egg deposition.

- **OVICIDAL ACTIVITY**

BIOVECTROL™ 612EC impairs the development or hatchability of eggs upon contact. The degree of ovicidal activity varies amongst different groups of insects.

- **SYSTEMIC EFFECTS**

BIOVECTROL™ 612EC exhibits systemic activities when applied through soil, seedling root dips, seed treatments and tree injections. The most pronounced



systemic effects are antifeedant and growth inhibition activities. Pests affected by systemic effects include caterpillars, beetles, whiteflies, leafminers, mites, aphids, thrips, etc.

- **PEST REISTANCE SUPPRESSION**

BIOVECTROL™ 612EC is an ideal tool for preventing or delaying insect resistance due to the reduction of mixed function oxidase (MFO) levels in insects, which contributes to the reduction of resistance possibilities amongst insect pests. The property of insect resistance possibilities reduction – due to its interference with the MFO synthesis – will help to manage, prohibit or delay resistance in key pests.

- **PLANT GROWTH STIMULATION / ENHANCEMENT**

BIOVECTROL™ 612EC will enhance plant health and possibly stimulates yields. It will show enhancement in photosynthesis and assimilate translocation, resulting in healthier plants with higher yields.

- **PREVENTION OF FUNGAL, VIRAL AND BACTERIAL INFECTION**

BIOVECTROL™ 612EC anti-fungal, anti-viral and anti-bacterial properties protect plants against infections. Its insect control properties will significantly reduce insect feeding, thus minimizing incidences of plant infections.

- **IMPROVEMENT OF SOIL CONDITIONS**

BIOVECTROL™ 612EC is effective against nematodes, fungi, virus and bacteria present in the soil and at the same time, more organic matters are being introduced into the soil – thus improving soil conditions for a better farming environment.

- **ENVIRONMENTAL AND ECO-FRIENDLY**

BIOVECTROL™ 612EC offers a holistic approach to extremely safe and effective insect pest management.



ADDITIONAL FEATURE

BIOVECTROL™ 612EC exhibits additional benefits as a disinfectant. The following test results show the basic bactericidal activity of BIOVECTROL™ 612EC at 80 times dilution (1:79) :

Test Organism	Reduction in viability, % killed after contact time of 60min
Pseudomonas Aureus	> 99%
Salmonella Typhimurium	> 99%
Eschrichia Coli	> 99%

SAFETY OF BIOVECTROL™ 612EC (ETOFENPROX®¹)

ETOFENPROX®¹

An organic compound composed of carbon, hydrogen and oxygen only. It has been highly evaluated by the World Health Organization (WHO) Pesticide Evaluation Scheme (WHOPES) and successfully approved by the Division of Control of Tropical Diseases, WHO in 1997 under Approval Code WHO/IS/97.24.1

TOXICOLOGY

▶ ACUTE TOXICITY

METHOD OF ADMINISTRATION	ANIMALS	LD₅₀ (mg/kg)
Oral	Rats	> 42,880
	Mice	> 107,200
	Dogs	> 5,000



Dermal	Rats	> 2,140
	Mice	> 2,140
Subcutaneous	Rats	> 32,160
	Mice	> 53,600
Intraperitoneal	Rats	> 42,880
	Mice	> 53,600
Inhalation (LC ₅₀ mg/m ³)	Rats	> 5,900

➤ **SKIN AND EYE IRRITATION**

Skin and eye irritation studies with rabbits indicated that it caused no irritations.

➤ **CHRONIC TOXICITY**

Life-span feeding studies with etofenprox® on rats, mice and dogs were conducted and no adverse effects were observed.

➤ **MUTAGENICITY, TERATOGENICITY and THREE-GENERATIONS REPRODUCTION**

No noticeable abnormalities were observed.

IMPACT ON THE ENVIRONMENT

➤ **AQUATIC LIFE TOXICITY**

Toxicity of etofenprox™ on aquatic lives:

<u>Species</u>	<u>TLm value (µg/l, 48 hours)</u>
Carp	5,000
Goldfish	1,730
Ayu Fish	1,200
Water Flea	>40,000 (3 hours)

➤ **BIRD TOXICITY**

Mallard Duck LD₅₀ >2,000 mg/kg

➤ **SOIL DECOMPOSITION**

- Half-Life of etofenprox® in aerobic soils was found to be approximately 1~3 weeks.



- Leaching tests confirmed that etofenprox® was not leached into the aquatic environment

➤ **PHOTOLYSIS**

- Half-Life of etofenprox® was found to be approximately 4 days when exposed to high intensity lamps at 30,000 lux.

APPLICATIONS and RECOMMENDED DILUTION RATIOS

SEED TREATMENT	1:20 - 30
SEEDLING ROOT DIP	1:400 - 600
SOIL DRENCH	1:1000 - 2000
SPRAY*	1:500 – 2000
CHEMIGATION	1:1000 - 2000

- Heavy infestation, use 1:300
- Normal spray, 5~7 / 10~15 days' interval
- Always dilute with clean water

STORAGE

- Keep container closed when not in use.
- Store away from foodstuffs and feeds.
- Avoid direct sunlight and high temperature storage.
- General ventilation and industrial preventive clothing is sufficient.

PACKING

BIOVECTROL™ 612EC is available in 1 liter, 5 liters and 20 liters pails. Other packing sizes are also available upon request.