



Vectra 3D™ contains 3 active ingredients: Dinotefuran, Pyriproxifen & Permethrin

"The continuous need for constant flea control further contributes to the potential for resistance development and calls for the development of new molecules."

Key Findings

- ✓ Year round treatment is recommended for the control and prevention of ectoparasitic infestations of pets.
- ✓ Products that are safe and applied directly to pets kill the ectoparasites of interest and are easiest to use for maximal owner compliance.
- ✓ Vectra 3D™ contains Dinotefuran, a potent insecticide with excellent activity against adult fleas and a very wide margin of safety for mammalian species.

Introducing a Brand New Flea Technology

Dwight D. Bowman MS, PhD, Professor of Parasitology
Cornell University College of Veterinary Medicine
Cathy Ann Ball, MS, VMD Summit VetPharm, LLC

INTRODUCTION

Controlling fleas on dogs is vital to maintaining the health of dogs and the human-animal bond between people and their pets. Today, the veterinarian is the key in the control of these and other blood-feeding ectoparasites. The lifelong, year-round treatment of the pet to prevent arthropod infestations as recommended by the Companion Animal Parasite Council (CAPC)¹ along with integrated flea control that targets multiple stages of the flea life cycle,² are two of the mainstays of providing a flea-free environment for a pet and the pet's family. Flea control should be a cornerstone of every veterinarian-patient relationship, because nothing can more easily improve the quality of a pet's life than the removal of fleas, while nothing can degrade or destroy the relationship between a pet and its family faster than the appearance of noxious fleas in a household.

In the past, flea control programs consisted primarily of methods that treated the environment and the animals separately. Previously, environmental treatments were just for buildings, carpet and furniture and surrounding grounds and consisted of fumigation and aerosols or spreading botanical, pyrethroid or organophosphates insecticides. The products for use on animals mainly targeted only the adult fleas. Many of these earlier treatments for animals had narrow margins of safety. Insect growth inhibitors and juvenile hormone mimics were just being introduced for use into environmental flea control. There were also numerous advances in the development products that worked very successfully through the direct application to the pet.



Innovative technologies have now provided safe and effective compounds that treat specific developmental stages of the ectoparasites. The combinations of these compounds effectively stop the entire life cycle of the ectoparasites. The compounds developed have been targeted to prevent the ectoparasites from feeding and to inhibit egg and larval development, thereby preventing re-infestations. These compounds are remarkably safe and can be applied directly onto pets.

DINOTEFURAN

One new generation of flea control technology is the neonicotinoid class of compounds. The name of this group of compounds comes from the base molecule which is nicotine. These neonicotinoids are derived through the chlorination of the aromatic pyridine ring of nicotine. The mechanism of action is similar to that of nicotine on the Acetylcholine (ACh) receptors of insects. ACh receptors are ionotropic receptors that form ligand-gated ion channels in the plasma membranes of cells. Nicotinic responses are of fast onset, short duration, and excitatory in nature. The neonicotinoids are ACh receptor agonists that bind irreversibly to postsynaptic nicotinic receptors on insects. This causes repeated excitatory impulses and continuous nerve stimulation resulting in tremors, uncoordinated non-purposeful movement, and death of the insect.

Dinotefuran, the newest, third generation neonicotinoid has ideal characteristics for fast flea adulticidal efficacy. Dinotefuran is unique in that its structure was derived from that of the acetylcholine molecule rather than nicotine. Also, it is a non-chlorinated, non-aromatic compound. Dinotefuran does not bind to the same sites as imidicloprid and other neonicotinoids, but at a unique site in the nerve synapse.³ Once bound, the agonist action of repeated excitatory impulses quickly kills the insect. Insects do not have to ingest dinotefuran, it kills on contact. Dinotefuran does not bind to mammalian ACh receptor sites.

Dinotefuran is a potent ectoparasiticide with specific action on the insect acetylcholine receptor and is very safe in mammals and other animals; the acute oral LD50 is >2,000 mg/kg (rodent), it is non toxic to dogs, cats, birds, fish and marine animals.⁴ The LD50 of Vectra 3D™ containing dinotefuran, pyriproxifen and permethrin is 5000 mg/kg of body weight in rodents.⁵

Dinotefuran is the flea adulticide in Vectra 3D™.

References:

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2. <http://www.capcvet.org>
3. Mori, K., et. Al. Interaction of dinotefuran and its analogues with nicotinic acetylcholine receptors of cockroach nerve cords. *Pest. Manag. Sci.* 2002 Feb; 58(2): 190-6.
4. EPA Pesticide Fact Sheet, September 2004
5. SVP Study 07006

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