

USE OF MAGNETIC CARRIER TO IMPROVE DELIVERY OF ACTIVE INGREDIENTS FOR URBAN PEST CONTROL

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Optimisation of performance of dry flowable powder formulations for control of crawling insect pests is known to involve control of particle size and effective distribution of active ingredient. Enhanced pick-up by the insect cuticle has been demonstrated through use of powder bearing an electrostatic charge. Several social insects have been shown to use the earth's magnetic field to help them orientate and navigate whilst foraging, migrating and building their nests. Insect cuticles have also been shown to respond to magnetic fields and in the case of several key urban pests the cuticle attracts magnetically charged particles. This poster describes how this property can be exploited to deliver improved control of these pests, illustrated by Magthanite™, a dry flowable powder with ferromagnetic properties which enhance the pick-up and retention of the active ingredient by the cuticle and its transfer to other insects in the colony, increasing secondary and tertiary kill. The effect has been demonstrated on key pest species including termites, ants and cockroaches, and with a range of active ingredients including fipronil, abamectin, permethrin, cyphenothrin, cypermethrin, bifenthrin and d-phenothrin. Tests on *Periplaneta americana* with fipronil at 0.1% concentration show the enhanced speed of action in a magnetic powder compared to a standard filler: 100% control achieved within 6 days compared to incomplete control after 10 days. This increased speed of action and level of control of *P. americana* in the magnetic powder formulation in comparison with a commercial powder formulation has also been seen demonstrated with abamectin at 0.05%. Laboratory arena tests were conducted in 2010 on *Blattella germanica* using a dry flowable powder with magnetic properties and attractant, incorporating fipronil at 0.05%, in comparison with commercial gel baits of abamectin at 0.05% and imidacloprid at 2.15%. These showed that the magnetic dry flowable formulation produced significantly increased mortality and a more rapid effect. This formulation type also offers the potential to reduce active ingredient concentration, illustrated by exposure of *Lasius niger* for 1 minute to a residual deposit of magnetic dry flowable powder with 0.5% permethrin, resulting in a similar effect to a standard 1.0% concentration: 100% knockdown in 10 minutes and 100% mortality. The latest tests in 2011 with bifenthrin at 0.09% in the magnetic powder formulation have also demonstrated 100% control of *B. germanica*. This technology now offers promise as a novel, enhanced delivery mechanism for urban pest control in a variety of situations.

Key Words Magthanite™, powder, formulation, control, speed, *Blattella*, *Periplaneta*, *Lasius*