

Degradation of Clothianidin in Soil with Organic Soil Amendments

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Abstract: The water soluble granule of 16% and granule of 0.5% clothianidin formulation was applied for control of brown planthopper, silverleaf whitefly, leaf miner, or pear psyllid etc., on rice, melon, pear, mango, tomato, cucumber, leafy vegetables, and tea in Taiwan. The degradation of clothianidin in soil with or without organic soil amendments was studied in the laboratory. Clothianidin was degraded slowly in laboratory experiments without organic soil amendments at 28 °C. The 86.7-98.1% of applied clothianidin was found in the soil without organic soil amendments within 70 days after application at a fortification level of 5, 25 or 50 µg/g of clothianidin. Comparison of degradation of clothianidin at a fortification of 25µg/g soils in sterilized and non-sterilized soils with different organic soil amendments revealed that clothianidin degraded more quickly in non-sterilized soils with soybean meal and rape cake amendments than in sterilized soils. About 60% of disappearance of clothianidin from non-sterilized soils with soybean meal and rape cake amendments within 28 days after treatments. Six bacterial isolates were selected from the soil with soybean meal or rape cake amendments for the degradation tests of clothianidin in soils. Three of these isolates caused obvious degradation (62-69%) of clothianidin in soils. The bacteria species identified with Biolog and partial sequence analysis of 16S rDNA gene, one isolate was identified to be *Bacillus simplex* AC-1 which had 98% similarity to *Bacillus simplex* strain WN579 16S ribosomal RNA gene, the other isolates, BC-4 and BC-5, was identified to be *Bacillus cereus* BC-4-5 which had 98% similarity to *Bacillus cereus*.

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