BIOASSAY FOR ROOT-KNOT NEMATODE-INHIBITING ACTIVITY IN SOIL

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The ban of methyl bromide and the lack of suitable alternatives has re-energized the search for biorational compounds and for suitable application methodology to protect crops against soilborne plant pathogens. One of the more promising approaches has been the coating of seeds to deliver plant protection compounds to the target site. Detection of the active ingredient in situ and monitoring its distribution in the rhizosphere would help to optimize this technology.

The detection of nematode-inhibiting activity in soil or rhizosphere is difficult because of the often minute amounts and the potential interactions with physical, chemical and biological components in that environment. Consequently such studies are typically labor and cost intensive. We developed a simple but sensitive bioassay for the presence of root-knot nematode-inhibiting metabolites. In order to demonstrate the properties of this method, we used the assay to follow the dissemination of nematicidal activity from abamectin coated cucumber seed in the rhizosphere of the seedlings over a 7 day period. Abamectin is a mixture of macrocyclic lactone metabolites produced by *Streptomyces avermitilis*. Seed coating with this compound is a new plant protection strategy to mitigate early root attack by plant parasitic nematodes.

Root observation boxes were filled with moist pasteurized sandy soil. They were seeded with one abamectin-coated (0.3 mg a.i./seed; Syngenta Crop Protection, Basel, CH) or non-treated cucumber seed (*Cucumis sativa* cv. Bilbao). After 3 and 7 days at 22˚C, soil samples were removed with a cork borer in 2 cm intervals in horizontal, diagonal and vertical directions, starting at 1 cm from the seed. Roots were carefully removed and cut into 2 cm segments. Each sample was placed into an Eppendorf tube and spiked with 245 J2 of root-knot nematodes (*Meloidogyne incognita*) in 0.1 ml water. After 24 hr incubation at 22˚C, soil or root samples were washed onto modified mini-Baerman funnels. Four days later, the recovered J2 were counted. The trial was conducted three times with similar results.

After 3 days, the nematicidal effect of abamectin was detectable up to 3 cm from the seed. The activity continued to spread spherically up to more than 5 cm at day 7 after seeding. The downward movement of the activity was also shown by assaying the root samples. The one closest to the coated seed resulted in the fewest nematodes while the number of J2 increased in samples of subsequent sections.