IN VITRO INHIBITION OF SOILBORNE FUNGI BY "SPK", A NOVEL PESTICIDE

Fanny B. Iriarte and Erin N. Rosskopf, USDA, ARS, U.S. Horticultural Research Laboratory, Fort Pierce, FL
Zhenli He and Youjian Lin, University of Florida, Indian River Research and Education Center, Fort Pierce, FL

A novel combination of organic compounds, referred to by the name "SPK", is currently under development by the University of Florida and USDA, ARS. In previous studies, the material showed pesticidal activity and no detrimental effect on pepper and tomato seed germination when used at a concentration of 0.5%. SPK was tested *in vitro* for the control of *Phytophthora capsici, Pythium aphanidermatum, Pythium myriotilum, Fusarium oxysporum, Sclerotinia sclerotiorum, Sclerotium rolfsii, Colletotrichum acutatum, Verticillium albo-atrum* and *Rhizoctonia solani*. A 0.7 cm diameter plug of a 4 - 6 day old culture of the different fungal isolates were transferred to Petri plates with ¼ potato dextrose agar containing a range of SPK concentrations from 0 to 1 %. Fungal radial growth was measured after the 3rd, 6th, and 9th day of incubation at 26 ^{o}C under continuous light. Complete inhibition of mycelial growth of *P.aphanidermatum* and *V. albo-atrum* occurred at an SPK concentration of 0.2%, *S. sclerotiorum*, *P. capsici*, *R. solani* and *C. acutatum* at 0.3%, and *P. myriotilum* and *S. rolfsii* at 0.4 %-0.5%. Hence, two additional experiments were carried out, one with SPK concentrations of 0.0, 0.1, 0.2, 0.3, 0.4 and 0.5 % (Exp.1) and another with SPK concentrations of 0.0, 0.1, 0.15, 0.20, 0.25 and 0.30 % (Exp.2). Three replications per fungus for each SPK concentration were included in each experiment and each experiment was performed twice. Percent kill was calculated based on radial growth of two replicate experiments combined and IC50 values were calculated using the Probit analysis for toxicology separately for each range of concentrations. A summary of IC50 values for both experiments and the nine fungi is shown in Table 1.

In the greenhouse assays, no phytotoxicity was observed nor were there any significant differences in the size of tomato or pepper plants transplanted 5, 10 or 15 days after potting soil was drenched with 30 ml of 0.0, 0.5, 1.0, 1.5, 2.0, or 2.5 % SPK solution. Further greenhouse evaluations are underway to determine SPK concentrations that are effective for control of Phytophthora blight of pepper and Fusarium wilt of tomato.

Preliminary investigations indicate that further research is warranted on this compound. If similar results are obtained under field conditions, SPK could be a promising component to an integrated control program for the control of soilborne pests of numerous crops without causing phytotoxicity. Advantages of using SPK would include a short plant back interval and the very low concentrations needed to provide effective soilborne disease control.

	IC50	
Fungus	Exp. 1	*Exp. 2.*
Colletotrichum. acutatum	*0.19*	*0.16*
Fusarium oxysporum	*0.16*	*0.14*
Rhizoctonia. solani	*0.14*	*0.14*
Verticillium. albo-atrum	*0.10*	*0.12*
Sclerotinia sclerotiorum	*0.22*	*0.16*
Sclerotium rolfsii	*0.21*	*0.21*
Phytophthora. capsici	*0.14*	*0.16*
Pythium. aphanidermatum	*0.05*	*0.05*
Pythium. myriotilum	*0.18*	*0.16*

Table 1. IC50 of nine soilborne fungi exposed to a range of SPK concentrations between 0 and 5% (Exp.1) and 0 and 3 % (Exp. 2). Values are based on two experiments using each of the two ranges of concentrations.