Chapter 9
The Toxic Effect of Trifluralin on Soil Microorganisms in the Presence of Fe^0/PVP Nanoparticles

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Abstract Nanoparticles Nano zero-valent iron (nZVI) Fe^0/PVP were prepared by chemical reduction from a ferrous salt-solution in the presence of PVP used as a stabilizer. The resulting nanoparticles were characterized by X-ray powder diffraction (XRD) analysis, scanning electron microscopy (SEM), transmission microscopy (TEM), and FT-IR–spectroscopy. Aqueous colloidal sollution of prepared nanoparticles was used in biotest. The results show that Fe^0/PVP nanoparticles can act as both stimulants and inhibitors of mycelial growth. The stimulating effect of Fe^0/PVP was observed on three out of five micromycete strains, namely 1LD, 5D and 8D. The growth of the strains *Alternaria sp.* 4D and *P. viride* was significantly suppressed in the presence of solution of Fe^0/PVP nanoparticles (the inhibition activity was 26.88% and 13.91%, respectively). At the same time, Fe^0/PVP nanoparticles stimulated the formation and maturation of micromycetes' spores.

Keywords Nanozero-valent iron (nZVI) · Poly-*N*-vinylpyrrolidone · Biotest · Trifluralin · *Alternaria* · *P. viride Streptomyces sp.*

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