Effect of zeolite and shell meal fertilizer amendment on antibiotic uptake in swine slurry

In the Republic of Korea, 1,211 Mg of veterinary antibiotic active ingredients were consumed in 2008. The medicines treated to livestock may reach to soil and water environment. Some studies have been shown the potential risk for the veterinary antibiotics to be taken up by plants from soil amended with antibiotic-laden animal manure. The objective of the study was to investigate the effect of zeolite and shell meal fertilizer amendment on antibiotic uptake by plant when veterinary antibiotics in swine slurry were applied to agricultural land. Model antibiotics used in the study were chlortetracycline (CTC), tylosin (TYL), and sulfamethazine (SMT). Chlortetracycline was not detected in lettuce by application of zeolite at rates of 1.5 and 6 Mg ha\(^{-1}\) as compared with about 0.4 \(\mu\)g kg\(^{-1}\) of CTC for control without amendment at 33 days after transplanting. Shell meal fertilizer application at rates of 0.5 and 2 Mg ha\(^{-1}\) reduced CTC level to less than 0.3 \(\mu\)g kg\(^{-1}\). For SMT, zeolite treatment decreased the concentration in lettuce while little reduction effect of shell meal fertilizer. Tylosin was not detected even for control without amendment at 33, 49, and 61 days after transplanting. The results in the study implied that zeolite amendment can reduce potential risk of antibiotic uptake by crops cultivated in soil fertilized with antibiotic-contaminated swine slurry.

Key word: antibiotics, swine slurry, lettuce, shell meal fertilizer, zeolite

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Fig. 1. Concentrations of CTC and SMT in lettuce at 33, 49, and 61 days after transplanting.