

Effect of Polyacrylamide and Synthesized Gypsum on Soil Quality

(폴리아크릴아마이드 및 합성 석고 처리에 의한 토양질 변화)

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Application of polyacrylamide (PAM), gypsum, or their combination as soil conditioners is considered to be very effective in controlling runoff and soil erosion. Gypsum provides Ca^{2+} as electrolyte into soils and it helps make a bridge between PAM molecules and soil particles resulted in clay flocculation. However, the effects of these soil conditioners on soil chemical and biological properties have not been well known. Furthermore, information on the synthesized gypsum using a waste material, as an alternative of commercial gypsum, is very limited. The objectives of this study were to investigate Ca^{2+} release kinetics of two types of gypsum from commercial and oyster shell wastes, and to evaluate the combination efficacy of PAM and gypsum on soil chemical and biological properties, and CO_2 emission from the soil. Treatments consisted of: no addition (control), 5 Mg ha^{-1} PAM (PAM), 10 Mg ha^{-1} commercial gypsum (CG), 10 Mg ha^{-1} synthetic gypsum from oyster shell wastes (SG), 5 Mg ha^{-1} PAM with commercial gypsum (PAM+CG), and 5 Mg ha^{-1} PAM with synthetic gypsum (PAM+SG). Our results indicated that both CG and SG significantly reduced the soil pH whereas all treatments partially increased soil EC. For all treatments, the concentrations of water soluble and NH_4OAc extractable Ca^{2+} were significantly increased and microbial biomass carbon was also increased at the beginning stage of incubation. The CO_2 emission was logarithmically increased before 64 days of incubation and then stabilized. We conclude that the synthetic gypsum from oyster shell wastes can be an effective alternative to commercial gypsum for enhancing soil quality. The study was supported by Ministry of Environment as “The GAIA project (No. 173-111-040)”.

Key words : Polyacrylamide, Gypsum, Soil respiration, Metabolic quotient, Cations

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