

폐광지 석탄토양에서의 지의류에 의한 토양미생물 활성증진

허재선

순천대학교 환경교육학과

Stimulation of soil microbial activity by lichen colonization in an abandoned coalmine dump soil

Jae-Seoun Hur

Dept. of Environmental Education, Suncheon National University, Suncheon, 540-742 Korea

Three lichen species of *Cladonia macilenta* Hoffm., *C. humilis* (With.) J.R. Laundon, and *C. ramulosa* (With.) J.R. Laundon were found on the surface of coalmine refusedump soil at Taeback city, Kangwon province, Korea. As the coalmine refuse have been dumped and weathered for more than 20 years, the coalmine dumps are still sterile and biologically inactive in a pioneer stage of succession. Characteristics of the coalmine dump soil were inhospitable to soil biota growth; high levels of heavy metals, low value of soil pH (pH4.57) and lack of microbial activity. Heavy metals accumulated in the lichen thalli were much higher than those in the soil. Soil microbial enzyme activities were apparently induced in the lichen-colonized coalmine (LCC) soil compared to noncolonized, bare coalmine (NBC) soil. Carbonaceous material (cellulose) was more rapidly decomposed in the LCC soil than in the NBC soil. Basal soil respiration was also much higher in the LCC soil than in the NBC soil. Incubation with hot-water extracts of the lichen thalli significantly stimulated soil respiration in both coalmine soils and the enhancement is more evident in NBC soil. The results imply that colonization of the soil lichen communities on the surface of coalmine dump soil plays an important role in the restoration of dump substrate into a biologically active and sustainable soil by establishing soil microbial flora and thus inducing soil microbial activities.