

# DIVERSE GROWTH PATTERNS OF PHOTOBIONTS ISOLATED FROM ANTARCTIC LICHENS

*Sung Mi Cho, Soon Gyu Hong and Jungeun Lee\**

*Korea Polar Research Institute, Incheon 21990, Korea*

*smcho@kopri.re.kr*

## ABSTRACT

Lichens are symbioses between fungi (mycobionts) and photoautotrophic green algae or cyanobacteria (photobionts). Most of lichen studies have focused on species diversity of photobionts and mycobionts, physiological characteristics of isolated photobionts are still unrevealing topic. For understanding how and why photobionts are sustaining symbiosis within lichen thalli, we collected 20 samples of *Cladonia gracilis*, *C. borealis*, *Himantormia* sp., *Ochrolechia* sp., *Psoroma* sp., *Umbilica antarctica*, *Usnea* sp., and *Xanthoria* sp. from near King Sejong Station and Adeli island in Antarctica. To isolate photobionts from these lichens, lichen samples after washing out were chopped and then roughly crushed by pestle in BBM media. Lysate filtered out by 20µm sieve were cultured in both BG11 and BBM solid media. On this culturing procedure, some photobionts were dominantly colonized and it was selected for further study. Five molecular regions, nuclear LSU, ITS and chloroplast *rbcL* for algae, and 16S rRNA and tRNA<sup>Leu</sup> intron for cyanobacteria were used to identify photobionts. Species diversity was estimated by molecular phylogenetic analyses using Maximum Likelihood and Bayesian methods, and morphology observation using light microscopy. Most photobionts were classified in Trebouxiophyceae and Chlorophyceae, and only few were identified as uncultured cyanobacteria. Three-dimensional growth morphology, color changes green to dark brown by culturing, highly dried colonization or mucilage colonization were observed. These diverse photobionts will be used in diverse researches such as abiotic stress resistance, interacting mechanisms with fungi, lichen morphology constructing process.