

Low molecular-weight compounds contributing to the dry heat tolerance of the terrestrial cyanobacterium *Nostoc* sp. HK-01

*Shunta Kimura^{1,2}, Midori Ong¹, Kaori Tomita-Yokotani³

1. Graduate School of Life and Environmental Sciences, University of Tsukuba, 2. Japan Society for the Promotion of Science, 3. Faculty of Life and Environmental Sciences, University of Tsukuba

Terrestrial cyanobacteria are useful for enabling bio-chemical circulation in closed bio-ecosystems, which is achieved owing to their photosynthetic and nitrogen fixing ability, utility as a food, and tolerance to harsh environments. Dried colonies of the terrestrial cyanobacterium *Nostoc* sp. HK-01 have a high tolerance to vacuum, UV, gamma-rays, heavy particle beams, and extreme temperatures. Tolerance to extraterrestrial environments is important for transportation to Mars. *Nostoc* sp. HK-01 has several different types of cells in its life cycle. The akinete (dormant cell) cell type of in *Nostoc* sp. HK-01 shows tolerance to dry heat. Some functional substances which provide tolerance against heat exist in the akinete cells. In this study, we investigated a property of low molecular weight compounds, which are accumulated in the akinetes of *Nostoc* sp. HK-01, to prevent protein aggregation after heating. The results of our study suggest that the compounds function as a compatible solute, which contributes to the dry heat tolerance of the akinetes of *Nostoc* sp. HK-01. The detailed mechanisms of action of the identified substances would be investigated in future studies.

Keywords: Akinete, Dry heat tolerance, *Nostoc* sp. HK-01, Terrestrial cyanobacteria