

Free amino acid composition of a terrestrial cyanobacterium *Nostoc* sp. HK-01 -Cyclical utilization as food resources in space-

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The terrestrial cyanobacterium *Nostoc* sp. HK-01 is a photosynthetic and nitrogen-fixing microorganism capable of tolerating harsh environmental conditions. Though *Nostoc* sp. HK-01 reportedly has a high nutritional value and produces high levels of proteins, the amount of free amino acids it produces has yet to be analyzed. Amino acids build proteins and play important roles in supporting life activities of humans. In this study, we aimed to analyze the amount of free amino acids in *Nostoc* sp. HK-01. *Nostoc* sp. HK-01 produces extracellular substances (ES) to protect itself from UV radiation and dryness. We quantified the intracellular and extracellular free amino acid content of *Nostoc* sp. HK-01 using extracts derived from dried colonies. We investigated the change in the amount of free amino acids after UV exposure, to determine whether UV radiation could be used in the space environment. We found that *Nostoc* sp. HK-01 produces 17 amino acids that make up human proteins, and that the amount of extracellular amino acids increased after UV exposure. We have discussed the method for its cyclical utilization as a food resource in space under a closed environment, based on the free amino acid composition in *Nostoc* sp. HK-01.

Keywords: A terrestrial cyanobacterium *Nostoc* sp. HK-01, Analysis of amino acids, Space food resources