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Study of effective utilization of the Nirogen-fixing terrestrial cyanobacterium based on the desiccation-related genes.

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Using DNA microarray from a terrestrial cyanobacterium *Anabaena* sp. PCC7120, the typical desiccation-responsible genes were selected and the gene-disruptant were characterized. All of typical gene-disruptants showed low viability under desiccation using cells grown in N_2-free medium. These results may suggest that desiccation-tolerant genes contain nitrogen fixation relating genes, are expressed irrespective of nitrogen content to protect desiccation sensitive N_2-fixing heterocyst and express to stabilize intra-and outer-cellular condition under desiccation in N_2-rich condition. We were also shown that the no-inducible photosynthesis gene, *psb28*, was related to desiccation tolerant. Psb28 protein associates with photosystem II but function of Psb28 is not enough to understand.

Desiccation tolerant N_2-fixing cyanobacterium, *Nostoc commune* is related to the *Anabaena*. The *Nostoc* has ability to use scientific research for desiccation tolerance system, food and soil for plantation. These abilities expect to improve devastating soil to nutrient-rich soil including space agriculture. So it was tried to isolate the *Nostoc* and succeeded to cultivate the *Nostoc* axenically. To confirm ability of the *Nostoc* soil, the *Nostoc* was used plantation as nutrient containing plate. The result of difference plant growth between N_2-deficient plate and cyanobacterial mat is now in progress.

Keywords: desiccation, tolerance, cyamobacteria, gene analysis, bioremediation, agriculture