The community structure of hot spring microbial mats in an alkaline, sulfide hot spring, Nakabusa

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The structure of microbial communities within hot spring mats at Nakabusa in Nagano Prefecture, Japan were compared at various in situ temperatures by denaturing gradient gel electrophoresis (DGGE) analysis of the PCR-amplified 16S ribosomal RNA gene fragments. Hydrogen-oxidizing Aquificales, thermophilic sulfate reducers Thermodesulfobacterium, Thermus and Desulfurococcaceae were detected at 73C-76C. At temperature less than 60C, Chloroflexaceae, Rhodothermus, candidate division OP10 and were detected. Thus, the microbial community structure at over 60C was drastically different from those at the lower temperatures.

The structure of microbial communities within hot spring mats at Nakabusa, Japan were compared at various in situ temperatures (48 to 76C) by denaturing gradient gel electrophoresis (DGGE) analysis of the PCR amplified 16S ribosomal RNA gene fragments. Using three sets of primers for domain Bacteria, cyanobacteria and domain Archaea, major two DGGE bands obtained from a gray-white mat in spring pool (76C; pH8.5; sulfide concentration, 0.019 mM) were related to thermophilic sulfate-reducing Thermodesulfobacterium group and Thermus group. The DGGE profiling of the white mat (73C) indicates the occurrence of thermophilic bacteria such as Aquificales, Thermodesulfobacterium group, Thermus group, and Desulfurococcaceae. At temperatures less than 60C, Chloroflexaceae group, Rhodothermus group, and candidate division OP10 were mainly detected. Synechococcus was mainly detected in the green mats (48C). Thus, the microbial community structure at over 60C was drastically different from those at the lower temperatures. Sulfide production markedly occurred in the culture bottle containing the gray mat and in situ spring water in the presence of ambient sulfate after the addition of lactate, hydrogen, or acetate at 66C. These results suggest that thermophilic SRB play a role of sulfide production in the gray mat at over 60C