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HIGH OCCURRENCE OF THERMOPHILIC BACTERIA ISOLATED FROM HYDROTHERMAL VENT PLUMES IN AUSTRALIAN-ANTARCTIC RIDGE, SOUTHERN OCEAN

Soo J. Yoon¹, Chung Y. Hwang¹, Inae Lee¹, Yung M. Lee¹, Soon G. Hong¹, Doshik Hahm², Tae S. Rhee², Sung H. Park³, Hong K. Lee¹

Division of Polar Life Sciences¹, Division of Polar Ocean Environment², Division of Polar Earth-System Sciences³, Korea Polar Research Institute, Incheon, Republic of Korea

INTRODUCTION

The intermediate spreading Australian-Antarctic Ridge (AAR) in the Southern Ocean is one of the largest unexplored regions of the global mid-ocean ridge systems because of limited accessibility due to harsh environment. Although activities of hydrothermal vents are supposed to be present in AAR, microbiological data are not available on cultivatable bacteria associated with those environments.

METHODS AND MATERIALS

During the IBRV Araon cruise in 2013, 14 samples of vent plumes were collected with Niskin bottles by CTD (conductivity, temperature and depth with potential reduction and turbidity sensors integrated) toying. Among the colonies grown on marine agar plates at 20°C from the vent samples, 139 colonies were randomly selected and purified for further investigations, determination of maximum temperature for growth and identification by 16S rRNA gene sequencing.

RESULTS

52 out of 139 (ca. 37%) strains were able to grow at 45°C, which are referred as thermophilic bacteria here, while the others were mesophiles. Among the isolated thermophilic bacteria, 42 strains were affiliated with *Firmicutes* and 9 strains with *Gamma-proteobacteria* based on 16S rRNA gene sequences. Mesophilic bacteria comprised of *Actinobacteria* (7 strains) and the above-mentioned groups (i.e. 17 and 64 strains for *Firmicutes* and *Gamma-proteobacteria*, respectively). Notably, two *Bacillus lichneformis* strains represented fast growing at the high temperature of 60°C, which are the first strains originated from deep-sea hydrothermal vent environments

DISCUSSION

As expected, thermophilic bacteria were abundant in the hydrothermal vent plumes. Gram-positive bacteria, *Firmicutes*, were dominant in the thermophilic bacteria in the study area, while *Proteobacteria* are often dominant in hydrothermal vents in other areas. This discrepancy might be attributed to different sources of vent fluids or different types of vent in respect to temperature and chemical compositions.

KEYWORDS: THERMOPHILE, BACTERIA, VENT, SOUTHERN OCEAN