ABSTRACT

GROWTH TEMPERATURE RANGES OF INDIGENOUS TEMPERATE AND TROPICAL SOIL BACTERIA

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In this thesis, soil bacteria were isolated from two different climatic zones, one temperate (Guilderland, USA) and the other tropical (Yallahs, Jamaica), during the warmest months of the year. The isolates were subjected to incubation temperatures of 2.0^{0}C to 48.0^{0}C and their minimum and maximum growth temperatures (T_{min} and T_{max}) determined.

During the month of sample collection, the average daily temperature for Guilderland was 21.6^{0}C and for Yallahs 28.0^{0}C. The mean T_{min} and mean T_{max} for temperate isolates were 6.6^{0}C (± 2.7^{0}C) and 35.5^{0}C (± 1.6^{0}C), and for the tropical isolates were 13.2^{0}C (± 3.2^{0}C) and 41.7^{0}C (± 3.8^{0}C), respectively. The 6-7^{0}C difference in mean T_{min} and T_{max} of the temperate and tropical isolates suggests that substantial diversity between the two populations probably occurs at the species level. Temperate isolates consisted of mesophiles and psychrotrophs while tropical isolates consisted of mesophiles only. Overall, the temperate strains grew closer to the monthly thermal niche boundaries of their sample site during the time

of sampling, than did the tropical strains. However, both temperate and tropical strains had an average growth temperature range ($T_{max} - T_{min}$) of 29.0^{0}C.

Two (2) tropical isolates had a T_{min} of 6.0^{0}C, approximately 14.0^{0}C below the lowest monthly minimum and yearly minimum temperatures for the sample site. It is suggested that these strains may have migrated from the cooler, mountainous areas near the sample site. Or that bacteria in general may posses the potential to grow over a wide temperature range and this allowed these two isolates to grow at temperatures outside of the boundaries of their natural habitat.

Keywords

Temperate bacteria, temperate zone, tropical bacteria, tropical zone, temperature effects, growth temperature.