

EVIDENCE OF A YEAST-DIAZOTROPH ASSOCIATION FROM AN ANTARCTIC SEA ICE ISOLATE USM-PSY62

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The initial objective of this project was to isolate and characterize psychrophilic nitrogen fixing bacteria from Antarctic sea ice. However, one isolate labelled USM-PSY62 was observed to be yeast-like rather than bacterial. Several observations showed that it might be clustered in the yeast group. Morphological study showed sexual reproduction through budding and branching. Although yeast was never reported as a nitrogen fixer, USM-PSY62 was able to reduce acetylene in several nitrogen free media (such as Burk, ATCC, NFDM and K1). Among these media, Burk medium showed the highest acetylene reduction activity. Acetylene reduction activity was optimum with mannitol as the sole carbon source and inhibition occurred when the medium was supplemented with urea, KNO_3 or $(\text{NH}_4)_2\text{SO}_4$ as a nitrogen source. Optimum acetylene reduction activity was also achieved in Burk medium at temperature 15°C and pH8. It was also observed that at a growth temperature of 20°C , the size of USM-PSY62 was dramatically increased both in length and width. Molecular biological analysis showed that USM-PSY62 contained both Internal Transcribed Spacer (highest identity with an unidentified yeast) and 16S rDNA (highest identity with *Psychrobacter sp.*). Hence, it was hypothesized that this isolate was yeast associated with a nitrogen fixing bacterium possibly as an endosymbiont. Further analysis is needed to uncover the nature of the association between the two.