

Ecological Survey of Halophilic Bacteria of Saltworks and Salted Foods

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Summary

Some characteristics of the 23 strains of extremely halophilic archaeobacteria selected, were examined according to the most recent taxonomic criteria and experimental methods. That is, morphological properties, the minimum concentration of NaCl and Mg^{2+} required for growth, pH range and amino acid requirement for growth, tolerance towards NaBr, and lysis in distilled water. Also, detection of archaeobacterial diether lipid and of $C_{20}:C_{25}$ diether core lipids as well as $C_{20}:C_{20}$ moiety was carried out according to thin layer chromatography. Furthermore, the thin layer chromatographic pattern of polar lipids of the 23 strains were compared with those of the known red extreme halophilic bacteria.

It was found that the properties of the halophiles examined, were analogous to those of genus Halobacterium, Haloarcula or Haloferax but not genus Halococcus, Natronobacterium or Natronococcus. In particular, the following 2 strains showed very interesting and unique characteristics: a strain No.133 had $C_{20}:C_{25}$ diether core lipid as well as $C_{20}:C_{20}$ moiety, and a strain No. 105 was a non-pigmented extremely halophilic archaeobacterium showing the minimum NaCl requirement as low as 1.5 M for the growth, the uniformly good growth in the wide range of 0.005 ~ 0.1 M Mg^{2+} , and high tolerance towards NaBr. Also, it was suggested from the thin layer chromatographic patterns of their polar lipids that the both strains would possibly be novel halophilic archaeobacteria.

After storage for 1 year at room temperature, ecological survey of halophilic bacteria was done with the 3 kinds of solar salt from Australia, Mexico and Thailand. The result showed that salt-tolerant and moderately halophilic bacteria almost died out during the storage while red extremely halophilic bacteria were still alive giving 10^3 viable cells per 1 g of salt.

Microbiological tests of salted squid making added with 10 ~ 30% of solar salt or refined salt, demonstrated that the salted fish meat alone permitted bacterial growth over all NaCl concentrations while the salted squid guts alone had bacteri-cidal action with increasing NaCl concentration.