

Microbial biodiversity in Bohai Bay saltworks and their biotechnological utilization

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Both in the field of aquaculture and of salt production, China is among the top producers at world level, with an annual aquaculture production of 53 million tons (data of 2010) and 100 million tons of salt production (data of 2012).

The multi-pond solar saltworks inhabit diverse microbial groups. Along the salinity gradient, the majority of microbial community changes from moderately halophilic bacteria to extremely halophilic archaea, and the biodiversity decreases as the environment becomes more hypersaline. In the crystallizer pond, the blooms of carotenoid-riched *Dunaliella* cells, halobacteria and archaea ensure the increased heat absorption as well as the reduction of the dissolved organics, eventually resulting in the enhanced evaporation and improved salt crystallization.

Apart from the ecological importance, the use of halophiles in biotechnology has been recently paid special attention. High salinity and long-term selection pressure have resulted in the unique cell structure, physiological functions and metabolic mechanism of the halophiles. Halophilic bacteria and archaea are a useful biological source to produce polyalkanoate, carotenoid pigments, etc. Moreover the easy lysis of the cells in the absence of salt and little danger of the contamination in high salt concentration of the culture medium facilitate the industrial application of the halophilic microorganisms.

We studied the microbial biodiversity of brine water with different salinities and seasons in Bohai Bay saltworks, the main salt production site in China. A number of culturable bacterial and archaeal strains were isolated and identified, and the culture conditions of the biotechnological compounds such as poly- β -hydroxybutyrate and bacterioruberin were studied with specific strains. This is expected to provide useful information on the potential utilization of microbial resources in saltern ponds.