

Exclusion of Microorganisms in Salt Water by a High Pressure Type Reverse
Osmosis Membrane

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Summary

In any emergency, it is essential to supply safety drinking water for suffering people. To supply safety drinking water, a sufficient amount of fresh water (FW) and a water purifier are needed. However, FW is not available in deserts or some small islands. Thus, a desalination apparatus is needed. Some trials are on going on desalination plants in desert countries like Saudi Arabia, and in domestic islands like Okinawa. Although there are no trial for mobile one in Japan until now, there might be critical needs in the near future. This study addresses the problem of estimating the microbiological quality of the water after treatment by high pressure-type reverse-osmosis (HPRO) by using endotoxin and poliovirus as markers. As preliminary experiments, those treated by low pressure-type reverse-osmosis (LPRO) were analysed for its water quality by using *E. coli*, λ phage and plasmid as markers.

After collecting approximately 300ml of sea water, the quantity of the endotoxin in the water was checked before (WB) and after (WA) the HPRO treatment. Removal of endotoxin was 99.54% in WA. Removal of NaCl by HPRO was 99.65% which was similar to that of endotoxin. Poliovirus, added to salt water, was completely removed in WA. In preliminary experiments, 100% of *E. coli*, λ phage and plasmid, and over 99.6% of poliovirus and endotoxin were removed by LPRO. These results suggest that there could be efficient removal of microorganisms by HPRO to the same level of RPRO.

Even in a non-arid country like Japan, there would be much benefit for people living on small islands during the the dry season to utilize salt water or during disaster. Thus, mobile HPRO systems are need in Japan and the practical systems should be developed in the near future.