WATER DESALINATION AND IT'S ENVIROMENTAL IMPACTS

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Content

Abstract

Desalination is perceived as an effective and reliable process for obtaining freshwater from aqueous saline solutions such as brackish water, seawater and brine. This can be clarified by the fact that >300 million people worldwide rely on desalinated water for their daily needs. Although the desalination process offers many advantages, there are rising concerns about possible adverse environmental impacts. Generally, environmental impacts can be generated both in the construction and operation of desalination plants. A major issue of desalination is the co-produced waste called ‘brine’ or ‘reject’ which has a high salinity along with chemical residuals and is discharged into the marine environment. In addition to brine, other main issues are the high energy consumption of the desalination and brine treatment technologies as well as the air pollution due to emissions of greenhouse gasses (GHGs) and air pollutants. Other issues include entrainment and entrapment of marine species, and heavy use of chemicals. The purpose of this review is to analyze the potential impacts of desalination and brine treatment on the environment and suggest mitigation measures.

water desalination process

Desalination definition

It can be defined as any process which removes excess salts and minerals from water (or) the chemical process of changing seawater into potable water are called desalination. These processes may be used for municipal, industrial or any commercial uses. In major desalination methods the feed water is treated and two streams of water are obtained

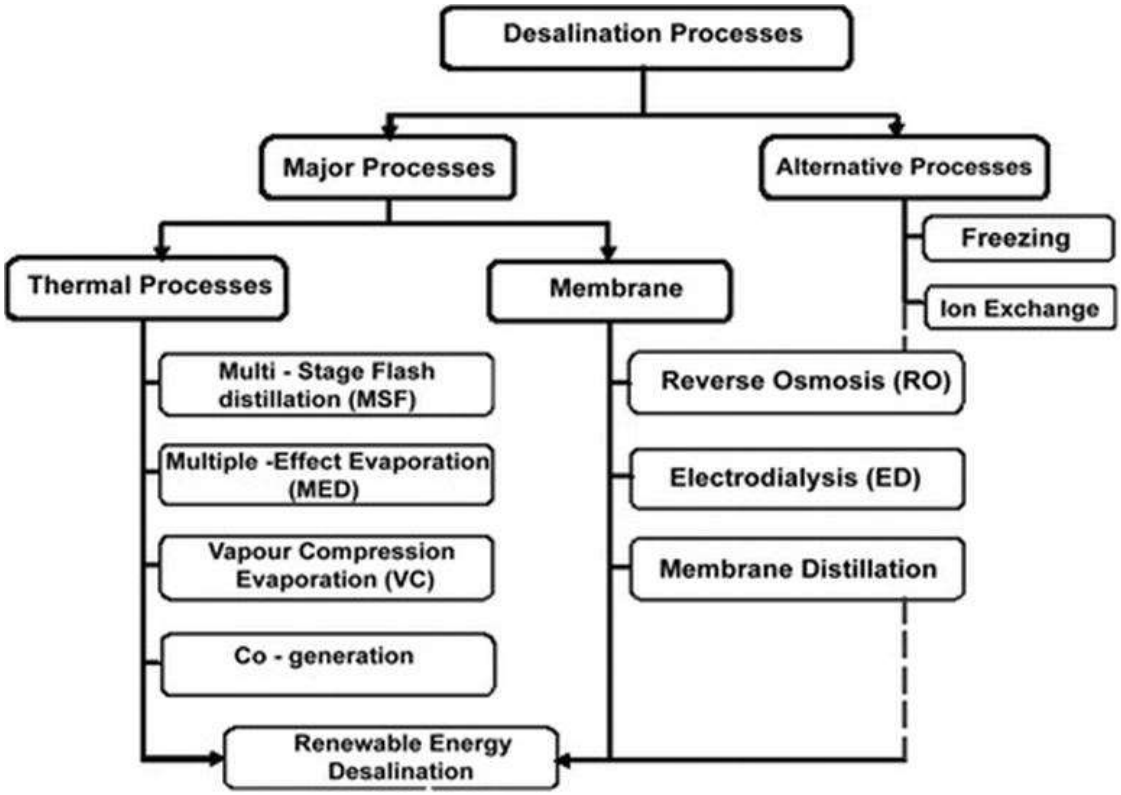
- Treated potable fresh water that has less amounts of salt and minerals(treated water or product water)
- Concentrate or brine that has salt and mineral concentrations higher than that of original feed water or saltwater

Salt water or feed water sources may include sea water, brackish, wells, surface (rivers and streams), wastewater, and industrial feed and process waters. With advancements in technology, desalination processes are becoming cost

effective compared to other methods of producing usable water to meet the growing demands. The water that is obtained after desalination should be remineralised to be fit for human consumption. The concentrated brine obtained in desalination process must be disposed of in a proper manner.

Water Desalination Technologies

Various desalination processes have been developed, some of which are currently under research and development. The most widely applied and commercially proven technologies can be divided into two types: phase change thermal processes and membrane processes, and, as shown in Figure 1, both encompass a number of different processes. In addition, there are the alternative technologies of freezing and ion exchange which are not widely used. All are operated by either a conventional energy or renewable energy to produce fresh water.



Classification Of Water Desalination Technologies

Enviromental impacts of water desalination

Marine organism tolerance is a critical point regarding effluent environmental impacts. Organisms must have a specific, and relatively constant, internal concentration of salts; however, this can be influenced by salt concentrations of surrounding media because of entry through semi-permeable membranes. Depending on their capacity for osmotic regulation, marine organisms generally have two possible strategies for coping with salinity changes. Osmoconformers organisms, such as echinoderms and most invertebrates, have a very low capacity to regulate internal osmotic concentration, which resembles their inhabited environment.