

## Reverse osmosis

Reverse osmosis (RO) is a technology for desalination of brackish or salt (sea) water, using semi-permeable membranes, producing demineralized water and a concentrated saline water stream. In horticulture applications reverse osmosis, especially low pressure RO systems (operating at max 8 bar)) is commercially and widespread used for treating brackish ground water. Total costs associated (OPEX and CAPEX) for water: 0.5 to 3 €/m<sup>3</sup>, depending on scale of installation. Energy costs (electric) 2-3 kWh / m<sup>3</sup>. Membrane fouling by organic pollutants and or precipitation of salts is one of the bottlenecks. By a good pre-treatment, dosing anti-scalents and monitoring this can be overcome. The RO technology produces a concentrate stream (in practice of about 10- 50% when using brackish ground water). In general the discharge of the concentrate to the surface water is restricted in a number of countries. When using reverse osmosis on brackish groundwater that is extracted from the first aquifer, a concentrate is remaining (the brine) that often is re-injected into the subsurface, the second aquifer. These brine concentrates, 10 to 50% of total volume, also can contain anti-scalent agents. The RO technology is considered robust and reliable.

RO has some limitations with retaining some low molecular ions like Boron, especially when using RO on sea water. Boron at high concentrations can harm crops.

Extra info
<a href="https://en.wikipedia.org/wiki/Reverse_osmosis">https://en.wikipedia.org/wiki/Reverse_osmosis</a>
<a href="http://www.lenntech.com/antiscalants.htm">http://www.lenntech.com/antiscalants.htm</a>
<a href="http://puretecwater.com/reverse-osmosis/what-is-reverse-osmosis">http://puretecwater.com/reverse-osmosis/what-is-reverse-osmosis</a>