

Membrane Scaling and flux decline during fertiliser drawn forward osmosis desalination of brackish ground water

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List of Tables

Table 1: Composition of the synthetic BGW feed with various TDS concentrations. This composition simulates the BGW usually found at the Buronga SIS in the MDB (Phuntsho 2012; Phuntsho et al. 2013). Osmotic pressure was calculated using an OLI Stream Analyser 3.2.

Table 2: Physical and chemical properties of membranes as provided by the manufacturer for TFC FO membranes and from various literatures for CTA membrane.

Table 1

TDS→			
Compounds↓	BGW10	BGW20	BGW 35
NaCl	3.713	7.426	13.000
Na ₂ SO ₄	1.794	3.588	6.280
KCl	0.134	0.268	0.470
CaCl ₂ .2H ₂ O	0.317	0.634	1.110
MgCl ₂ .6H ₂ O	3.947	7.895	13.820
NaHCO ₃	0.094	0.189	0.330
Total TDS (g/L)	7.824	15.647	27.382
π (atm)	5.35	10.56	18.56
pH	7.72	7.63	7.33

Table 2

Sample	Active layer material	Pure water permeability ($A=1 \text{ m}^{-1}\text{h}^{-1}\text{bar}^{-1}$)	NaCl Rejection R(%)	Salt permeability ($B = 10^{-7} \text{ m/s}$)	Membrane thickness (mm)	Operating pH
CTA	Cellulose triacetate	0.64 ± 0.03	60 ± 4	9.8	93 ± 3	3-8