A study was undertaken to measure carbon dioxide degassing in a cascade column operating with both fresh (0‰) and saline water (35‰ NaCl) at 15 °C. The cascade column contained bio-block type packing material, was 1.7 m long in each dimension, and was tested both with and without countercurrent air exchange. The CO2 concentration of the influent and effluent water was measured using submersible infrared CO2 probes over an influent range of 10-60 mg L−1 CO2. Carbon dioxide degassing was quantified in terms of the mass transfer coefficient (kLa, log concentration driving force divided by packing height) and the CO2 stripping efficiency (the difference in CO2 concentration between the influent water and the effluent water that has re-established chemical equilibria approximately 1 min after exiting the column). Mass transfer coefficients were similar between fresh and saline water. Countercurrent air flow did not improve stripping efficiency, probably because the column was already operating at a high mass transfer rate with no active ventilation and there was sufficient passive, concurrent air flow to overcome the accumulation of CO2 inside the column. There was a positive relationship between influent CO2 concentration and CO2 stripping efficiency, which ranged from 67-89% CO2 stripped in a single pass. The CO2 stripping efficiency was lower in saline water compared to freshwater at equivalent influent CO2 concentrations. The dependence of CO2 stripping efficiency on salinity was attributed to differences in the ionization fractions of inorganic carbon species in the effluent water. The results indicate that CO2 removal will be more problematic for saline or seawater recirculating systems compared to freshwater systems.