

# Experimental Investigation of Phytodesalination and Growth Rate of Duckweed (*Lemna minor*) in Salt Water Hydroponics and Developing a Generalized Linear Model for Desalination

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Less than 1% of the Earth's water, a nonrenewable resource is accessible as fresh water to us. Global warming, industrialization and exponential growing human population is exacerbating food and freshwater shortage. Exploring the potential of duckweed as a phytodesalinating agent for salt water would alleviate both the issues and serve as a model for a better environment.

**Purpose:** This investigation aims at growing duckweed hydroponically in different saline solutions (SS) to test its desalination potential. **Procedure:** In this investigation, 0.63 g Duckweed ( $\frac{1}{4}$  tsp) was grown in a commercial hydroponic nutrient solution (HS) as a control, distilled water, a 1%, 2%, and 3% salinity increased solution. Electrical conductivity (EC) and pH were measured every 3 days over a period of 30 days. Spectrum grow lights were set on a 16/8 hour cycle. **Data:** The average decrease of EC for SS, 1% (826  $\mu\text{S/cm}$ ), 2% (677  $\mu\text{S/cm}$ ) and 3% (608  $\mu\text{S/cm}$ ), indicated that duckweed desalinated all solutions. Experimental data fit the trend line of a generalized linear model. Phytodesalination rate change (PRC) was calculated to see the date at which desalination was most effective for each saline solution. A paired t-test was conducted to validate the significance of the data, comparing the desalination rate of SS to HS. Fresh weight of duckweed increased in 1% and 2% SS, but decreased in 3% SS. This research underscores duckweed as a sustainable solution to alleviate water scarcity and food insecurity amidst a warming climate.