# The Effects of Sodium Perchlorate on *dsx1* Gene Expression of *Daphnia magna*

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**Abstract:**

Sodium perchlorate is an endocrine disrupting chemical (EDC) that has been commonly used as an oxidizer and found in tap water. The Environmental Protection Agency (EPA) is the entity that governs environmental protection regulations. This EDC competitively inhibits iodide uptake in the thyroid gland of vertebrates but has been minimally investigated on how it affects the endocrine system of invertebrates. In this study, we use model organism *Daphnia magna* to explore how different concentrations of sodium perchlorate (0, 10, and 100ppm) affect the morphology and expression of a target gene known as the Doublesex gene (*dsx1*). This gene is involved in environmental sex determination and specifically regulates male trait expression in *D. magna*. For our morphometric assay, we measured 4 different parameters (core body width, caudal spine length, head height, and first antennae length) using ImageJ at 0, 2, and 7 days following exposure. For our gene expression assay, we used the same exposure specifications but different time points of 2 and 48 hours. Using a 2-way ANOVA on morphometric data, we found that caudal spine length and body width were affected by sodium perchlorate in both female and male *D. magna*. Using semi-quantitative reverse transcriptase PCR we found that expression of *dsx1* for the 2hr 10ppm treatment group, as well as the 48hr 100 ppm group, tended to decrease, although not significantly. Further research will help in providing viable data for the Environmental Protection Agency (EPA) in determining the maximum contaminant level goal so that they can proceed to enforce a standard of regulation in drinking water.