# Altered Toxicities of Fatty Acid Salts in Green Paramecia Cultured in Different Waters

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Detergents including fatty acid salts act as surface-active agents and thus possibly damage the plasma membrane structures of aquatic organisms. Therefore, when excess, the house-used and industrial outflows of such detergents into aquatic environments may have considerable impacts on the ecosystem. In this study, we propose the use of green paramecia (*Paramecium bursaria*) for assessing the acute toxicity of eight fatty acid salts (Na and K salts of oleate, palmitate, laurate and myristate) under various water conditions. The *Paramecium* in the stationary phase were used for a toxicity assay carried out on 12-well microplates and the median lethal concentration ($LC_{50}$) was determined for each fatty acid salt. In the low mineral culture medium prepared with ultra-pure water, the $LC_{50}$ for each fatty acid ranged from 5.8 to 144 ppm (w/v). The toxic levels of fatty acid salts differed in the following order: laurate, myristate ≥ oleate, palmitate. The toxic levels of oleate and palmitate salts were *ca.* 10-fold lower than those of laurate and myristate salts. When river water and local tap water instead of ultra-pure water were used for culturing, the toxic levels of all fatty acid salts were drastically lowered compared to the low mineral condition by 30- to 100-fold (198–660 ppm, w/v). Similar detoxification effect was observed when Ca or Mg was added to the low mineral culture media, indicating that the toxicity of fatty acid salts can be notably lowered as the mineral content increases. As we demonstrated that toxicities of fatty acid salts can be lowered in river water and tap water compared to the low mineral condition, some chemical substances behave differently in the different water conditions. Therefore, the use of natural waters reflecting the real environmental conditions in further collection of data on the ecotoxicity impacts of variety of chemicals is highly encouraged.

*Key words:* Bioassay, Green Paramecia, Fatty Acid Salt, Water Hardness