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Whalen Symposium Abstract

Pharmaceuticals and personal care products have become of increasing interest due to their abundance in wastewater influent and effluent as well as their effect on freshwater ecosystems. Caffeine, a common central nervous system stimulant, is of particular interest because of its abundance in aquatic water systems as well as its popular consumption by the public. The stimulant enters waste water influent mainly through human excretion. Current wastewater treatment facilities are efficient in removal of influent caffeine concentrations; however, it becomes reintroduced to water systems through other vectors downstream and can have adverse effects on aquatic life. Caffeine has been linked to anxiogenic effects such as characteristic diving behavior, increased thigmotaxis, reduced exploration, and increased erratic behavior in individual zebrafish in acute concentrations (Ladu et al 2015). The present study aims to test the acute effect of caffeine on juvenile fathead minnow (*Pimephales promelas*) swimming behavior at environmentally relevant concentrations of .04 μg/L and 9.5 μg/L, a concentration of 35 μg/L, as well as a positive control of 50 mg/L and negative control of 0 mg/L. Environmental relevance was measured and reported from the Ithaca Area Wastewater Treatment Facility. Fish were exposed for 30 minutes prior to observations in ramekins holding 300 ml of each respected solution. EthoVision live video recording software was used to track distance moved, velocity, as well as time spent in the center (thigmotaxis). Our study observed no statistically significant change in swimming behavior of minnows at environmentally relevant concentrations. However, we observed a significant decrease in the total distance traveled and the average velocity of the 35 μg/L group and a significant decrease in the distance traveled and average velocity of the positive control group.

References:

1) Ladu, F., Mwaffo, V., Li, J., Macrì, S., & Porfiri, M. (2015). Acute caffeine administration affects zebrafish response to a robotic stimulus. *Behavioral brain research*, *289*, 48-54.