ABSTRACT

TITLE:	Effects of Sodium Nitrite on Xenopus Tadpoles
AUTHOR(S):	Hanna, Rachael ; Hutchins, Ginny
PRESENTED AT:	4th Annual Natural & Behavioral Sciences Undergraduate Research Symposium, Fort Lewis College

ABSTRACT: Chemical preservatives are used in preserving meats. Preservative use has been linked to a number of health problems. To study the developmental effects of one preservative chemical, sodium nitrite, Xenopus tadpoles were selected as a model organism, because of their sensitivity to toxicity and ability to thrive in captivity. I hypothesized that tadpoles exposed to sodium nitrite would show decreased average weight, increased mortality rate, and decreased developmental progress compared to control tadpoles. Fifty Xenopus tadpoles were exposed to sodium nitrite at a concentration of 5mg/L; an additional 50 tadpoles were used as a control. The experiment was conducted for six weeks; 25% of the water volume was filtered three times weekly, and a heater was used to ensure optimal water conditions. Average weight, mortality rate, and limb bud development was then compared between the experimental and control groups. Comparing the average weights of the two groups using a Student's t-test revealed a p-value of .00916, demonstrating a statistical difference between the groups. It was also found that only 26% of the experimental tadpoles died compared to 40% of the control tadpoles. Limb bud development was also found to be more advanced in the experimental rather than control tadpoles. These results did not support my original hypothesis that predicted sodium nitrite would have a detrimental effect on tadpole survival and development. However, additional research found that sodium nitrite must be converted within organisms into dimethylntrosamine in order to have toxic effects; this chemical conversion of may have been blocked by the presence of vitamin C and K3 in the tadpole food given to both groups. Results also indicate that sodium nitrite has the potential to serve as a promoter of growth and development in some organisms. Future research on the different effects of various preservatives on organisms will help further elucidate their potential impact on cellular growth and development.