

Project Proposal
Bio 3B
Saddleback College
Fall 2010

Proposal Title

The Effects of Triclosan® on Activity in Goldfish, *Crassius aurata*

Principle Investigators

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Investigators Background

The principal investigators of this research project are both student in Biology 3B at Saddleback College. Tim received his Bachelors in Business Administration from Tarleton State University in Texas and is a Registered Radiologic Technologist. Mary has been attending Saddleback College earning her AA degree in Nursing. Mary plans to transfer to a nursing program or physician's assistant program.

Project Summary

The proposed research project will study the effect of Triclosan®, an ingredient in various antibacterial products, on the overall activity of goldfish. Triclosan®, polychloro-phenoxy phenol, is a widely used antibacterial substance and it is regularly washed down drains into the common sewer system (Barnes, 1977; Baker and Gleeson, 1999). It could, in theory, end up in waterways or the coastal marine environment. Chemical introduced into freshwater environments through commercial and residential sewer system have documented detrimental effects on several species of freshwater fish (Bowers and Brown, 1982; Brown, et al, 2002; Buck and Barnes, 2000). In 1999, Burgers and Chiappe found that phosphate washed into residential drain caused second, third and even fourth heads or tails to develop in striped bass found in Lake Mission Viejo. Later work by Cate and Perkins (2003) found that these supernumerary heads and tails were actually functional and that these bass spent significantly more time swimming and looking for mates. This study will assess the effects of Triclosan®, if any, on a model fresh water fish, the goldfish, *Crassius aurata*. The implications of this work are far-reaching. The Food and Drug Administration is currently reviewing the status of Triclosan® (FDA website, 2011). Data on its effects could impact the status of this widely used product.

Project Description

The research project will take place over a period of ten weeks. In the first week, 24 goldfish will be purchased and equilibrated to holding tanks. Then in the second through third weeks, gold fish will be placed into separate focal tanks, where, using video recording technology and a grid system, they will be monitored for a period of 24 hours. Video will be analyzed for total line crossing during the 24 hour period. Following this, during weeks 4 through 8, fish will be subjected to two level of Triclosan® one at 100 ppm and one at 250 ppm. Fish will be held in their assigned Triclosan® environment for 24 hours, and then a 24 hour video recording will be made. All fish will be tested on

both Triclosan® environments, assigned in a random fashion. Data for total line crossing will be analyzed using an ANOVA and post hoc testing, if warranted.

References Cited

Barnes, L.G. 1977, Drainage pattern for various chemical in southern California **Systematic Zoology** 25 (4):321-343

Baker, E.J. and Gleeson, T.G. 1999 Phosphates in drains. **Journal of Experimental Biology** 202, 3081–3087

Bowers, M. A. and Brown, J. H. 1982, Effect of phosphate on freshwater fish development. **Ecology**, 63, no.2: 391-400

Brown, J.H., Kelt, D.A., Fox, B.J. 2002, Embryological effects of dishwashing soaps on fish. **Naturalist** 160, no. 6: 815-818

Buck, C.L. and Barnes B.M. 2000, Effects of sanitation chemical on the rate of development in striped bass. **Am J Physiol Regulatory Integrative Comp Physiol**, 279: R255–R262

Burgers, P. and Chiappe, L. M. 1999, Supernumerary head and tail in response to phosphate in striped bass in Lake Mission Viejo. **Nature** 399: 60-62

Cate, T.M. and Perkins, T.D. 2003, Functional supernumerary cephalization in striped bass **Tree Physiology** 23: 1077-1079

US Food and Drug Administration. 2011. Triclosan, What Consumers Should Know. <http://www.fda.gov/ForConsumers/ConsumerUpdates/ucm205999.htm> accessed 12 FEB 2011

Budget

24 Goldfish, to be purchased to Pet Smart by investigators

Triclosan® concentrate

24 holding tanks

Video camera, to be provided by investigators

Note: All references were created for demonstration purposes only.