



**CALIFORNIA STATE SCIENCE FAIR  
2011 PROJECT SUMMARY**

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**Project Title**  
**Coral Reef Pollution: The Effects of Tricaine Methane Sulfonate on Seriatopora Coral**

**Abstract**

**Objectives/Goals**  
The purpose of the experiment was to find if the fish sedative tricaine methane sulfonate (or MS-222) is toxic to Seriatopora coral and what chances a specimen would have of being harmed by it at a specific concentration.

**Methods/Materials**  
For my project, I used a 30-gallon salt water tank, 4 "turbo" algae grazing snails, 130 coral fragments (yet only 80 were experimented on), two pieces of live rock, over 100 mL of MS-222, a 5-chambered plastic container, a Canon DSLR camera with a 100 mm macro lens, 1 mL syringe, refractometer, and aquarium-keeping paraphernalia. Prior to experimentation, the coral specimens adjusted to life in the 30-gallon salt water tank. The specimens were photographed individually and divided into five populations of ten specimens; population 1 (the control population) was exposed to a concentration of 0.5 ppm, population 4 was exposed to a concentration of 1 ppm and later to a concentration of 8 ppm (two weeks after the first exposure), and population 5 was exposed to a concentration of 2 ppm. One specimen from each population was submerged in the 5-chambered tank (that contained the MS-222 solutions) for the duration of a minute, after which the specimens were removed, rinsed with salt water, and placed back in the tank. This process was repeated for the remaining specimens and after a period of three weeks, they were photographed and categorized into nearly dead, partially bleached and healthy. A chi-squared goodness of fit test was used on the numbers of healthy corals in the populations.

**Results**  
I found from the chi-squared goodness of fit test that the numbers of healthy corals between populations 1 and 4 were statistically different.

**Conclusions/Discussion**  
The tricaine methane sulfonate caused severe tissue loss in many of the corals (mainly the ones in population 4), which in some cases led to secondary infection by microbes such as cyanobacteria. Also, the fact that the chemical was statistically harmful to the corals at a high concentration suggests that in a real-life situation, wild or aquarium corals could be harmed by a spill or overdose.

**Summary Statement**  
The goal of my project was to find if tricaine methane sulfonate, a commonly-used fish sedative, is harmful to Seriatopora coral.

**Help Received**  
Father helped take pictures, set up tank, and time coral exposure; aunt and uncle trained me for interviews/discussion; M Wandell from the Cal Academy of Sciences supplied coral; L Kormos from Academy of Sciences helped with initial concept, methods, and MS-222 source; biology teacher helped