CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
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Project Number
S1504

Project Title
The Effect of O.T.C Drugs on Daphnia

Abstract

Objectives/Goals
When humans and livestocks excrete drugs, it enters the sewers and into our streams, affecting the creatures living underwater. The objective of this project is to determine what the effect of O.T.C drugs are on Daphnia.

Methods/Materials
Materials used in this project include 1 gallon dilluted water, pipettes, 50 Daphnia, 1 bifocal compound microscope, teaspoon, timer, plates, cups, cover slips, and slides. I hypothesize that as the pH level of the drug decreased, the heartbeat of the Daphnia would increase. To test this out, I added over the counter drugs (Naproxen, Acetaminophen, Aspirin, and Ibuprofen) to a group of Daphnia. I also added a combination of drugs to another group of Daphnia to recreate a similar affect one might find in a pond or stream. Using the microscope and timer, I recorded the heart-beats per minute of the Daphnia.

Results
Daphnia#s normal heartbeat being 182 per minute, all four of the drugs had a similar effect on the Daphnia#s heart rate; the drugs, all suppressants, speed up the heartbeat rate, being between 4% and 31%. Aspirin (C), increased the heart beat rate of 31%, had the strongest effect on the Daphnia, and Naproxen (A), increased the heart bate of 4.7%, had the least effect on the Daphnia. Ibuprofen (D) and Acetaminophen (B), respectively, increased 11.3% and 22.2%.

Conclusions/Discussion
The results prove that over the counter drugs have an immediate effect on Daphnia. If the drugs were to enter the wild, which they do, the Daphnia population would be poisoned, and eventually die off; the Daphnia#s heart rate will rise when exposed to acidic drugs and too much exposure can leave the female Daphnia to infertility. Looking at a larger scale, this test was just conducted on over the counter drugs on a small sample of Daphnia. However, the fact remains that millions of different drugs enter the water each day- ranging from harmless vitamins to deadly cancer fighting drugs to anesthetics- and affect a variety of marine biology. So if one "harmless" over the counter drugs can speed up the heart beat of a Daphnia by 31%, imagine what is happening today as millions of deadly drugs are pouring into our streams and lakes, and affecting the creatures living there.

Summary Statement
The use of pharmaceuticals by both humans and livestocks contaminate and poison animals, lakes and streams.

Help Received
Mother and father bought Daphnia and microscope