CALIFORNIA STATE SCIENCE FAIR
2014 PROJECT SUMMARY

Name(s)
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Project Number
J1028

Project Title
Bioremediation vs. Chemical Cleaning of Oiled Birds and the Effluent

Abstract

Objectives/Goals
My objective was to determine if a top bioremediation agent, (OSEII -the only 1st response EPA listed bioremediation agent) used for cleaning oil spills could be applied to the cleaning of oiled birds and perform as effectively or better than the top chemical cleaning agent (DAWN- used for the past 30 yrs.) in cleaning oiled birds and remediating the effluent.

Methods/Materials
I designed and implemented a procedure based in part on the internationally accepted cleaning protocol of oiled birds at treatment facilities.
I used three different types of feathers (Primary/ Contour/ Down) and expanded the research to include treatment of the effluent produced during the cleaning process.
Light crude was used so no pretreating was necessary.
All feathers were soaked in oil for 5min., blotted and weighed
Each feather was then submerged in 1 wash/1 rinse solution of 50mL of each cleaning agent to 500mL. of water (51.2mg/L hardness) heated to 40ºc. and 1 wash/rinse control consisting of water with no cleaning agent
Each wash/rinse cycle was timed for 10 min. with agitation for .5min at 1, 5 &10min.
Feathers were removed, blotted once and hung to dry for 2hrs then weighed again.
All cleaning and rinse water was then added to three aerated 10gal aquariums containing 5 gal of water (51.2mg/L hardness) each. Water levels were marked and temperatures recorded.
Aquariums with effluent were monitored for 30 days.

Results
The bioremediation agent removed 3% more oil than the chemical agent and completely detoxified the effluent leaving only CO2 and water. The chemical agent cleaned the feathers leaving slightly more residue but showed no remediation of the effluent. The control neither cleaned the feathers nor remediated the effluent.

Conclusions/Discussion
I feel these results may indicate the possibility of a less stressful protocol for cleaning oiled birds due to the reduction in handling time (fewer rinse tubs and no final spray rinse), a reduced amount of effluent (a typical oiled bird requires an average of 2 to 300gal. of water to clean) and a protocol that can at the same time remediate the effluent so there is no need for further toxic waste treatment.

Summary Statement
My project was testing to see if a top bioremediation agent could perform as well or better than a top chemical agent in cleaning oiled birds and remediating the effluent.

Help Received
Mother helped type report, purchase needed equipment and display board materials, and took pictures during my experiment.