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**Environmental Protection Service  
Rm #200, 4999-98 Avenue  
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**File No: 4808-13**

**Manager, Customer Relations  
Sphag Sorb Sales  
7430 – 52<sup>nd</sup> Street NW  
Edmonton, Alberta T6B 2G3**

Dear Earth Care Products Management

Thank you for providing the Sphag Sorb peat product for use during the development of our guidelines for evaluating the toxicity of sorbents. I have appended descriptions of the toxicity tests performed using your product and the results. In brief, the product was non-toxic to rainbow trout at 10 g/L. I have also appended a summary of toxicity test recommendations for sorbents developed as a result of this product. If you have any questions, please do not hesitate to contact me.

Sincerely

Sandra Blenkinsopp, Ph.D.  
Environmental Scientist

cc Gary Sergy  
Merv Fingas, Chief, Emergencies Science Division



## **Toxicity Test Results on the Peat Moss Product**

### **Rainbow Trout Testing**

Rainbow trout were purchased from Rainbow Springs Hatchery in London, Ontario. Fish were shipped to Moncton, New Brunswick and acclimated at the facility to a temperature of 15°C. The fish were maintained at  $15 \pm 2^\circ\text{C}$  for a minimum of 2 weeks before use in testing. A reference toxicant, phenol, was tested once a calendar month for each batch of fish used in these tests. The LC50 value was entered into the control chart to ensure the test was within normal operating conditions.

Sphag Sorb was used to help us determine appropriate soaking times for sorbents. The appropriate volume of control/dilution water (soft dechlorinated municipal), amount of Sphag Sorb (10 g/L), adding it to the appropriate tanks and soaking for 1 or 24 hours. Sphag Sorb was then removed by netting with a small fish net and squeezing to return most of the liquid to the test chamber. Sphag Sorb was also tested after a 1-hour soak, with the Sphag Sorb left in the test vessel during the test.

Prior to test organism introduction, the test solutions were pre-aerated for 30 minutes at  $6.5 \pm 1$  mL air/minute/L solution. Rainbow trout acute lethality tests (freshwater) were conducted on resultant solutions according to EPS 1/RM/9 (Environment Canada). For pre-tests, one concentration (10g/L was retested as a multi-concentration test with 5 concentrations of dissolved oxygen, pH, salinity and conductivity. Fish were then introduced into each test container in a random order. The test continued for 96 hours with checks of fish behaviour or mortality, temperature, pH and dissolved oxygen at 24, 48, 72 and 96 hours as a minimum. At the end of the 96 hours, the test was completed. The control fish were measured for length and weight, and loading density was determined.

For single concentration tests, the percent mortality in the test and control fish was calculated. For the multi-concentration test, an LC50 was calculated using the Toxstat Version 3.5 statistical program. The LC50 is an estimate of the concentration at which half of the test organisms die. The LC50 is quoted with 95% confidence limits.

### **Results**

Sphag Sorb was tested after a 1 and 24-hour soak, after which time the Sphag Sorb (Peat Material) was removed by netting. Sphag Sorb was tested after a 1-hour soak, and the product was left in the vessel during the test. No Mortalities were observed in any of these tests during the 96-hour test period, therefore, this product, Sphag Sorb, was non-toxic to rainbow trout at 10 g/L. Sphag Sorb depressed the pH of the test solutions to below pH 5 units even after the 1-hour soak, while the pH of the control water remained at 7 pH units.

All reference toxicants were within warning limits. All tests had  $\leq 10\%$  mortality of the fish in the control populations.

## **References**

Environment Canada.1990 Biological Test Method: Acute Lethality Test Using Rainbow Trout EPS 1/RM/9. Environment Canada, Environmental Protection, Ottawa

Toxstat 3.5. West Inc. Western Ecosystems Technology, Cheyenne, WY

## **Summary of Toxicity Test Recommendations for Sorbents**

1. The Maximum sorbent concentration tested should be 10 g/L.
2. Sheet-type sorbents should be cut into 1 cm cubes before soaking.
3. Two types of solutions should be prepared from sock-type sorbents and tested. One should be prepared by soaking the intact sorbent (i.e. in a sock), and the other should be prepared by soaking the loose sorbent (i.e. minus the sock), followed by filtration through a dip net (approx. 0.5 mm mesh size).
4. Sorbents should be soaked for 24 hours to prepare test solutions.
5. Products should be netted or picked out and squeezed to extract water that is returned to the test tank before test animals are exposed. If the product sinks, it may be left in the tank, unless it interferes with the test animals.
6. The Rainbow Trout Acute Lethality Test (freshwater) and the Sea Urchin Fertilization Inhibition Assay (seawater) are suitable toxicity tests for evaluating sorbents.

Table 1. Results of Rainbow Trout Tests on the Sphag Sorb Products received from Earth Care Products

Test Protocol	LC50 (95% Confidence Limits) g/L
Loose Product, 1 hour soak, filtered through net before testing	>10
Loose product, 1 hour soak, product left in during testing	>10
Loose product, 24-hour soak, filtered through net before testing	>10