

EEE BRANCH REVIEW

DATE: IN _____ OUT _____ IN 9/20/76 OUT 1/21/77 IN _____ OUT _____
FISH & WILDLIFE ENVIRONMENTAL CHEMISTRY EFFICACY

FILE OR REG. NO. 6836-40
PETITION OR EXP. PERMIT NO. _____
DATE DIV. RECEIVED _____
DATE OF SUBMISSION 3CID-NO
DATE SUBMISSION ACCEPTED _____
TYPE PRODUCT(S): I, D, H, F, W, R, (S) Cooling Tower Slimicide
PRODUCT MGR. NO. 24
PRODUCT NAME(S) Bardac-LF
COMPANY NAME Lonza, Inc.
SUBMISSION PURPOSE " ...to meet environmental chemistry requirements"
CHEMICAL & FORMULATION diotyl dimethyl ammonium chloride ethyl alcohol

1. Introduction

Registrant submits data "...to meet the environmental chemistry requirements needed to evaluate outdoor use products as outlined in the July 1975 Rules and Regulations, page 28276."

Product names Bardac LF is registered under 6836-40 and contains a combination of dioctyl dimethyl ammonium chloride and ethyl alcohol as active ingredients.

2. Directions for Use

Label:

Bardac LF for the Repackaging or Formulation of Low-Foaming Water Treatment Microbiocides (Algaecide, Bactericide)

Sample Label:

Brand Name Low Foam Water Treatment Microbiocide Twin-Chain Quaternary Ammonium Compound Concentrate Low Foam Water Treatment Microbiocide for Building and Industrial Cooling Towers.

Use 16-21 fluid ounces per 1000 gallons of water to be treated. Repeat every 7 days or increase frequency if needed. Treated effluent should not be discharged where it will drain into lakes streams, ponds or public water.

Sample Label

Brand Name Low Foam Swimming Pool Algaecide Outstanding Algae Growth, Depressant.

Use 1 gallon for each 50,000 gallons of water or ratio thereof. Maintenance dose is 1 quart every 5-7 days or as necessary. Treated effluent should not be discharged where it will drain into lakes streams, ponds or public waters.

Note: Ethyl alcohol not active ingredient on this sample label. Quat is present at 10%, while for cooling tower use quat is present at 50% and ethanol at 10%.

3. Discussion of Data

Registrant of Data Registrant submits document entitled "The Biodegradability of Low Concentrations of Certain Quaternary Ammonium Antimicrobials by Bacgeria" by L. J. Gawel and R. L. Huddleston Continental Oil Comapny, Ponca City, Oklahoma, presented at American Oil Chemists' Society National Meeting Los Angeles, California, April 23-26, 1972. Publication status of this document is not reported by registrant.

Five compounds were tested for "biodegradation" by bacteria. Bacteria used was obtained by mixed culture from soil and raw city sewage. No further identification of bacteria provided. All inocula

were grown on gyratory shakes (250 rpm) at 22°C with proper aeration. Analytical methods were colorimetric for both the quaternary compounds and the phenolic compound. UV spectrophotometry was used concurrently for one of the aromatic quaternary compounds. Colorimetric method for quats is sensitive to 0.25 ppm parent compound. Method does not analyze degradation products. Method for phenolic has unknown sensitivity. Non-radiolabeled materials were used. The compounds tested were didecyl dimethyl ammonium chloride, dioctyl dimethyl ammonium chloride, alkyl (C₁₄) dimethyl benzyl ammonium chloride, alkyl (C₁₄) dimethyl ethylbenzyl ammonium, and pentachlorophenol. Test level was 10 ppm initially.

Results:

All four quaternary compounds showed 5-8% remaining after 48 hours as parent compounds. When cultures were acclimated for 24-48 hours, the rate of degradation increased. But after longer periods of acclimation (9 days), degradation of parent quats was only about 50%, with alkyl quats slightly more degraded than aromatic quats.

Pentachlorophenol degraded only 20% over 10 days in phenol adapted cultures.

Conclusions

The study is inadequate in that the following discrepancies are not addressed by the experiment:

- 1) Exact nature of the material tested is not described. Report is not clear whether the quaternary ammonium compound was tested alone or as formulated material.
- 2) Non-radioisotopic materials were used, whereas radioisotopic techniques or comparable techniques are required.
- 3) Material balance is lacking, whereas material balance is required.
- 4) The nature and amounts of degradation products are not reported, whereas these are required.
- 5) No information on the degradation of the active ingredient ethyl alcohol, which is required.

- 7) The study cannot delineate the effects of adsorption to soil or sediment particles as may be expected to occur in the environment.

- 8) No evidence is presented to show that the test level approximates expected concentrations in the environment.

4. Conclusion

The submitted study entitled "The Biodegradability of Low Concentrations of Certain Quaternary Ammonium Antimicrobials by Bacteria" is inadequate and does not fulfill environmental chemistry data requirements per Section 3 Regulations.

No opinion on unreasonable adverse effects on the environment for this product can be given, since the data is inadequate.

5. Recommendations

No recommendations
See conclusions

For registration, the following data on each of the six active ingredients and as proposed combination are required under current operating procedures.

- 1) Hydrolysis study is conducted on each active ingredient individually and as proposed combination. Radioisotopic or comparable techniques are required. Acidic, neutral, and basic pH's are used. Two concentrations and two temperatures are required.

Aliquots in duplicate should be taken at four sampling intervals with at least one observation made after one-half of the pesticide is hydrolyzed, or 30 days, whichever is shorter. A material balance half-life estimate and identification of degradation products must be provided. Concentrations should approximate use rate and 10X use rate.

- 2) An activated sludge metabolism study of the effects of each active ingredient individually and as proposed combination on wastewater treatment processes is required. Synthetic sewage (nutrients) and radioisotopic material are added to activated sludge and aerated in a dosed system for 23 hours; the sludge is allowed to settle for 30 minutes. A liter of supernatant (effluent) is removed for analysis of parent compound and degradation products, including a material balance. Add fresh synthetic and test compound to the remaining sludge and re-

peat the cycle. Dosage should start at 0.1 ppm and increase by increments to 100 ppm. Effects on microbial population must be determined by daily total counts of viable organisms in sludge.

RE Ney 2-1-77

Ronald E. Ney
R. W. Cook
1/18/77

RW Cook 2-1-77
Environmental Chemistry Section
Efficacy and Ecological Effects Branch