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NALED

Task 3: Environmental Fate Profile

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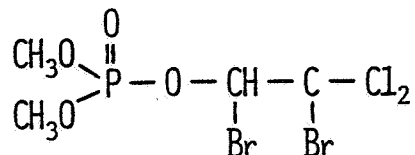
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NALED

Task 3

NALED, BROMEX, DIBROM, RE 4355



1,2-Dibromo-2,2-dichloroethyl dimethyl phosphate

Environmental Fate Profile

Available data are insufficient to fully assess the environmental fate of naled.

Naled (formulation unspecified), at 10 ppm, rapidly degraded with half-lives of 1.4-4.0 hours in soils ranging in texture from sand to silt and incubated at 80% field capacity and room temperature (00074759). The degradate dichlorvos was found at a maximum concentration of ~10% of applied naled within 24 hours after treatment. Dichlorvos (10 ppm) also rapidly degraded in the test soils, with half-lives of 2.3-8.0 hours.

Naled (100 µg/ml) degraded rapidly in aqueous solutions buffered at pH 5.0, 7.0, and 9.0 (00074691 and 00074885). Half-lives at 21 C ranged from ~0.25 to 25 hours, whereas those at 37 C ranged from 0.05 to 6 hours. Naled (100 µg/ml) also degraded rapidly in sewage water samples (pH 7.0) incubated at room temperature, with a half-life of 23 hours; dichlorvos (3 µg/ml) was also detected (00074644).

Radiolabeled naled exhibited low to intermediate mobility in soils ranging in texture from loamy sand to clay based on soil thin-layer chromatography tests (00064796). Dichlorvos was intermediately mobile to mobile in the same soils. Mobility of both compounds may be related to soil organic matter content.

Dissipation of naled (Skychoda, 34.9% ai, formulation unspecified) in sewage water was rapid following addition of ~5 ppm to a trickling filter in a sewage treatment plant (00074645). A maximum of 0.04 ppm was detected 20 minutes after treatment, but after 24 hours, no naled was detected (<0.015 ppm). The breakdown products dichlorvos and dichloroacetaldehyde were detected at maximum concentrations of 0.4 and 0.04 ppm, respectively, 20 minutes after treatment, but neither compound was found in samples taken 24 hours after treatment.

Naled, at 2 ppm, had little or no effect on the respiration of Azotobacter vinelandii; however, at 100 ppm, respiration was inhibited ~90% (05005579). Dichlorvos (DDVP), at 2 and 100 ppm, inhibited respiration by ~29 and 57%, respectively.

Naled did not accumulate in whole body tissues of killifish (Fundulus heteroclitus) exposed to naled (Dibrom 14 EC, 85% ai) at 0.031, 0.063, and 0.127 ppm in static bioassay tests (sea water: pH 7.3 to 7.5; dissolved oxygen content 6.6 to 7.8 mg/l; daily temperature range 10-17 C) (00074643). Naled was not detected (<0.02 ppm) in any fish tissue samples taken over the 7-day test period. The degradate dichlorvos was found at a maximum concentration of 0.04 ppm, approximately twice the concentration in corresponding water samples, 1 hour after treatment, but was not found (<0.01 ppm) in tissue samples taken after 24 hours. Naled half-life in water samples was <24 hours. Dichlorvos was found in all water samples, at a maximum concentration of ~0.02 ppm after 24 hours, but <0.01 ppm was found in samples taken at the end of the test period.

In summary, naled and its degradate dichlorvos dissipate rapidly in aerobic soils with half-lives of ≤8 hours. Naled exhibits low to intermediate mobility in soils, whereas, dichlorvos is intermediately mobile to mobile. Mobility appears to be related to soil organic matter content. Naled degrades rapidly in aqueous solution (half-life ≤25 hours), with rates increasing at higher temperatures and pHs. Naled also rapidly degrades in sewage water (half-life <24 hours) to dichlorvos and dichloroacetaldehyde. Neither naled nor dichlorvos accumulate in fish tissues. In conclusion, naled does not appear to represent an environmental hazard based on the aforementioned data which indicate very rapid degradation and extremely low bioaccumulation potential.

Summary of Major Data Gaps

The major data gaps for this chemical are: hydrolysis studies; photodegradation studies in water and air and on soil; aerobic and anaerobic soil metabolism studies;

aerobic and anaerobic aquatic metabolism studies; leaching studies; volatility studies; terrestrial, aquatic, forestry, and long-term field dissipation studies; and rotational and irrigated crop studies.

References

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