SUMMARY

Fluorochemicals FC-95 and FC-143 were shown to be completely resistant to biodegradation in a 2½-month shake culture biodegradation study. The mixed microbial test cultures used in this study were derived from activated sludge inocula obtained from three waste treatment systems (Chemolite, Decatur, & the Twin Cities Metro plant). The cultures were maintained in dilute yeast extract-basal salts media supplemented with the hydrogen analog of the respective fluorochemicals. Test cultures also contained FC-95 or FC-143. Phenol and 1-dodecene-derived linear alkyl sulfonate (LAS) were used as reference compounds. Their degradation demonstrated that biodegradation could occur under the test conditions. All cultures were transferred 15 times over the 2½-month period, and temperature was controlled at 25° C. during the latter half of the experiment.

In the final growth period, degradation products of ^{14}C-labeled fluorochemicals were assayed for by thin-layer chromatography (TLC) and gas liquid chromatography (GLC). Chemicals separated by TLC were visualized by TLC-autoradiograph. Methylated and nonmethylated culture extracts separated by GLC were detected by electron capture. No degradation products were detected. Scintillation counting showed that all radioactivity associated with the labeled fluorochemicals remained in the culture medium.

In all but the final growth period, fluorocarbon biodegradation was monitored simply by measuring the initial and final fluoride concentration in the media. No increase in fluoride concentration was observed indicating that if biodegradation did occur, it did not result in the release of fluoride. Control cultures supplemented with fluoride showed that fluoride is not lost from the media under the experimental conditions used.

While this study cannot rule out the possibility that conditions could be found that would allow the biodegradation of these compounds, the results of this study suggest that these chemicals are likely to persist in the environment for extended periods unaltered by microbial catabolism.