Aquatic Fate of Herbicides

Fluridone

Florpyrauxifen-benzyl (FPB)

$K_H$ (Henry’s Law)

$K_{d}$ (Sediment Sorption)

$K_{BAF}$ (Bioaccumulation factor)

$\Phi$ (Photochemical Degradation)

Biodegradation
Photolysis

Quantum Yield ($\Phi$) = sensitivity to photons
$k_{obs} = $ observed rate of degradation

Lake water and Ultrapure water incubated with herbicide, irradiated at 311 nm

Direct Control $k_{obs} >$ Lake $k_{obs}$
Only undergoes direct photodegradation

$\Phi_{FPB} >> \Phi_{Fluridone}$

**FPB**

$\Phi = 0.02$

**Fluridone**

$\Phi = 0.004$
Fluridone Sediment Sorption

\[ K_d = f_{oc} \times K_{oc} \]

- \( f_{oc} \): fraction of organic content in sediment
- \( K_{oc} \): compound specific only
- \( K_d \): sediment & compound specific

\[ y = 145.14x - 81.466 \]
\[ R^2 = 0.9975 \]

FPB \( K_{oc} = 21,777 - 44,278 \rightarrow \text{much more sorptive than fluridone}^{1} \)

\[ K_d = 145 \text{ L/kg} \]
\[ K_{oc} = 366 \text{ L/kg} \]

\(^1\text{Review of Florpyrauxifen-benzyl for Application to Massachusetts Lakes and Ponds. MDAR/MassDEP, 2019.}\)
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