

COMPARATIVE STUDY OF PYRIMETHANIL AND TRIADIMENOL PHOTOCATALYTIC DEGRADATION

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Abstract

The application of photocatalytic techniques in wastewaters containing non-biodegradable pesticides has been gaining interest in the last years owing to increasingly low effluent limits [1-4].

The photocatalytic degradation of two fungicides widely used in tomato plantations, pyrimethanil and triadimenol, has been studied. The effect of pH and H_2O_2 concentration (0-25 mM) on the photocatalytic mineralization of both pesticides has been established.

Experiments with pyrimethanil indicate that the fastest degradation, measured as degradation rate (K_d) is highest between pH 7 and 9. However, mineralization (K_m) is faster at pH 5. Results with triadimenol are rather different since pH effect on degradation (K_d) is limited and degradation and mineralization rates (K_d and K_m) are quite similar. Results are illustrated by Figure 1.

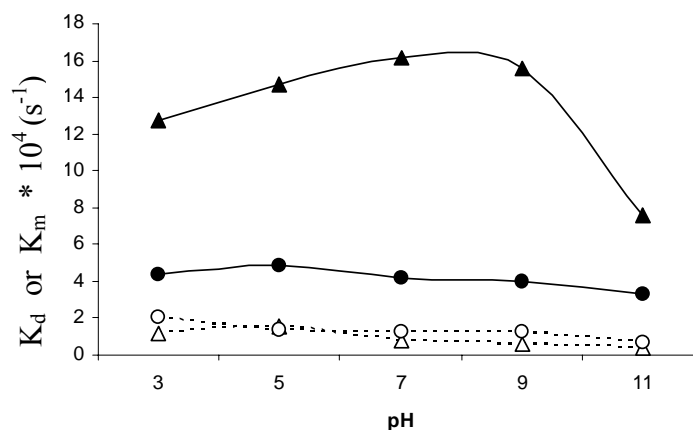


Figure 1. Effect of pH on K_d and K_m for triadimenol (\bullet , \circ respectively) and pirimetanil (\blacktriangle , \triangle respectively).

Additionally, the presence of H_2O_2 slightly increases triadimenol's K_d as the oxidiser concentration is incremented up to 10 mM (Figure 2). However, at higher concentrations, K_d becomes lower.

The effect of H_2O_2 on pyrimethanil degradation is different as K_d is notably reduced (Figure 2) at higher concentrations

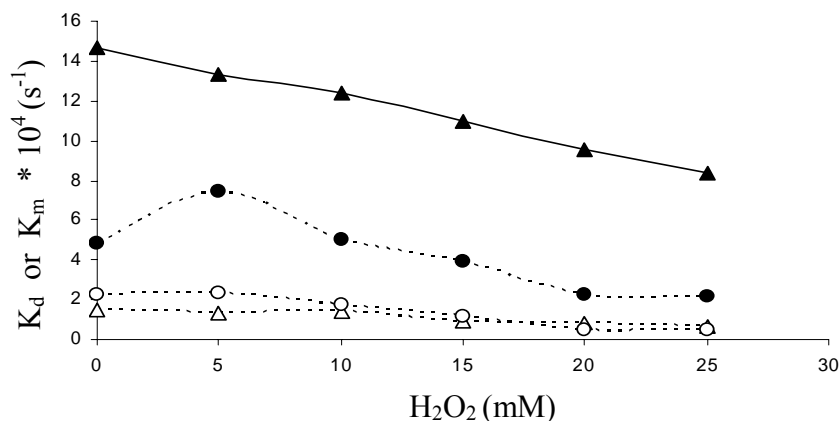


Figure 2. Effect of H₂O₂ concentration on K_d and K_m for triadimenol (●,○ respectively) and pirimethanil (▲,△ respectively).

Analyses by Gas Chromatography with Masses detector and FTIR Spectroscopy have allowed explaining the obtained degradation results for both pesticides.

Also, solar photocatalytic degradation experiments have been carried out to infer the ability of this technique at treating wastewaters containing the organics.

References.

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