

## Synthesis, Environmental Monitoring and Risk Evaluation of Etofenprox-Ester.

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### Abstract

Etofenprox applied to a paddy field diffuses into river water and undergoes various reactions such as hydrolysis or photolysis, resulting in formation of an etofenprox-ester, 2-(4-ethoxyphenyl)-2-methylpropyl 3-phenoxybenzoate. Since the half-life time of etofenprox is relatively long (17.5 days), the ester is less likely to be detected at high concentrations in the water environments. In this study, the concentrations of etofenprox and the ester in actual river waters were determined in order to see whether a transformation product of a pesticide is determined at lower concentration than that of its parent (intact) pesticide which has a long half-life time. The synthesis of the ester was also conducted because it was not available in the market (Figure 1 and 2). Contrary to our expectations, etofenprox and the ester were detected at high concentrations. Therefore, the acute immobilization tests with *Chironomus yoshimatsui* and *Daphnia magna* were performed to determine the acute effect concentration (AECd) of them. Fortunately the ecotoxicity risk of the ester was negligible. However, its concentration was approximately at the same level as the registration withholding limits of etofenprox (Figure 3). Consequently, monitoring concentrations of a transformation product and its parent pesticide which has a long half-life time are important to assess the ecotoxicity risk of them (Figure 4).

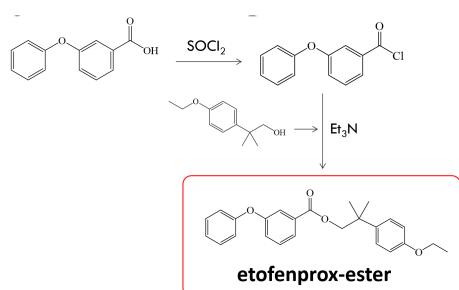


Figure 1. Synthesis of etofenprox-ester

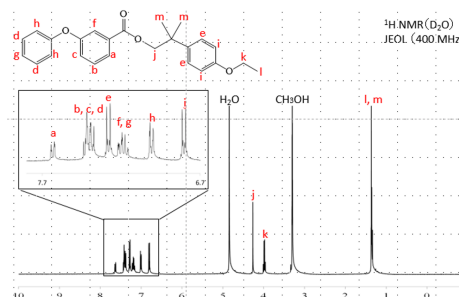


Figure 2. <sup>1</sup>H-NMR spectrum of etofenprox-ester

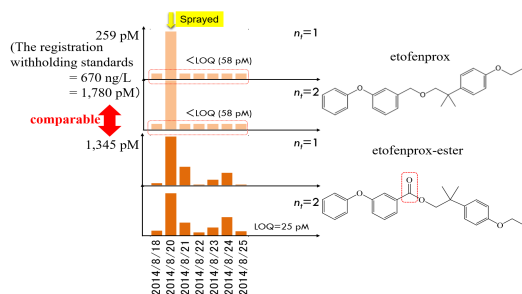


Figure 3. The concentrations of etofenprox-ester

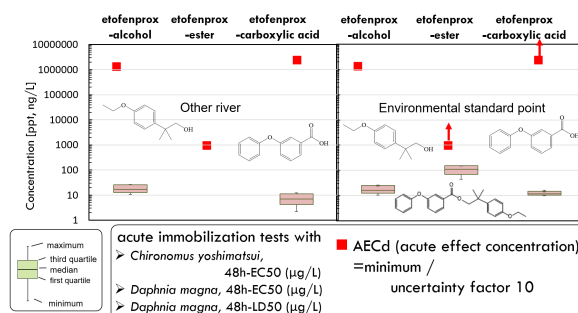


Figure 4. Risk evaluation of etofenprox PTPWs

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