

河川水體中短鏈氯化石蠟流布及毒性放大之效應探討
Distribution of short-chain chlorinated paraffins in rivers and toxicity
amplification effect of trophic transfer

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Abstract

Short-chain chlorinated paraffins (SCCPs), a new emerging persistent organic pollutant, have garnered increased attention worldwide due to their potential harmful effects. Research studies have shown that SCCPs have negative effects on organisms, and this evidence is growing. However, in Taiwan, there is currently no research investigating the impact of SCCPs concentrations in actual environmental water on biological and ecological toxicity. To address this gap, our study aimed to (1) investigate the SCCPs concentrations in five rivers (16 sampling sites) in southern Taiwan, (2) expose *Pseudokirchneriella subcapitata*, *Daphnia magna*, and *Chironomus riparius* to SCCPs standard solutions of highest and average concentrations, and; (3) feed the exposed *P. subcapitata* to *D. magna* and *C. riparius* to observe growth inhibition and mentum deformity.

Our results showed that SCCPs concentrations in the water samples ranged from N.D. to 0.757µg/L with an average of 0.337µg/L, which was lower than the maximum acceptable concentration standard value of the European Water Framework Directive (1.4 µg/L). The presence of SCCPs in water and/or food inhibited the growth of *P. subcapitata* and *D. magna*, while *C. riparius* experienced toxic effects, including mentum deformity. Mentum deformity was observed in *C. riparius* larvae that were exposed to SCCPs concentrations (0.337µg/L) in water and fed with SCCPs-containing algae that had previously been exposed to different concentrations of SCCPs. Our study underscores the need for further investigation of the trophic level transfer and the risk of cross-generational toxicity effects of SCCPs.

關鍵字：短鏈氯化石蠟、無脊椎生物、抑制、畸形、淡水營養階層

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