Airborne chlorpyrifos residues during pre- and post-spraying hours of application in rice fields of Malaysia

ABSTRACT

Repeated application of chlorpyrifos using mist blower sprayer to control insects is a common practice in the rice growing areas of Malaysia, which ultimately resulting in a potential exposure to field workers specially spray operators at the application site. In order to determine airborne chlorpyrifos residue in rice field at pre-, during and post-spray periods, 12 h day-long air sampling through passive (PUF patch) and active (PUF plug cartridge) samplers was done during wet and dry seasons at three sampling locations of Sungai Besar, Malaysia. The peak amount of chlorpyrifos correspond to the period of spray application (50 min) at the breathing zone of spray operators, which was insignificantly higher in dry season (186.68 µg/m3) than in wet season (153.50 µg/m3). At pre-spray period, no chlorpyrifos was virtually quantified in any of the samples exposed in the early morning air. However, in post-spray periods, residue levels were consistently higher at first post-spray (0 – 4 h) than that of second post-spray (4 – 8 h) period. Airborne residues between two sampling seasons showed significant variations at post-spray periods during which higher detection was observed in dry season (48.62, 19.71 ng/cm2 on passive sampler and 4.19, 1.54 µg/m3 on active sampler) than that of wet season (21.28, 9.36 ng/cm2 on passive sampler and 1.79, 0.54 µg/m3 on active sampler). The present study indicates that substantial amounts of field-applied chlorpyrifos were shown to become airborne as result of spray application that might cause health hazards to field operators.

Keyword: Airborne residue; Chlorpyrifos; Active air sampling; Passive air sampling; Rice field