

Reduction of the volatilisation of pesticides from glass surfaces by adjuvants

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After the application of plant protection products, a fraction of the active ingredient (a.i.) enters the atmosphere through volatilisation. This volatilised amount of pesticides contaminates the environment and reduces the protection of the crop. Vapour pressure of pesticides available in literature is determined of the pure component. Pesticide fate models used in risk assessment based on such vapour pressures do not incorporated the effect that pesticides formulations can have on the volatility. When pesticides are used in the field, a mixture of pesticides and adjuvants is used. Vapour pressure of such a mixture is not available. Dissipation of fenpropimorph, pyrimethanil, chlorpyrifos-ethyl and lindane as pure active ingredient, formulated by different types of adjuvants and in commercial formulation was studied. A polymeric surfactant (butyl block copolymer), an anionic surfactant (alkoxylated phosphate ester), a non-ionic surfactant (ethoxylated alcohol) and methylated seed oil were evaluated. The pesticides were applied in a wind tunnel and dissipation was measured up to 4 days after application. An empirical model assuming exponential decay of the volatilisation rate was used to calculate the volatilisation. Dissipation of fenpropimorph, pyrimethanil, chlorpyrifos-ethyl and lindane was according their vapour pressure. Our results demonstrated that in 48 hours, up to 90% of the pure fenpropimorph and lindane volatilises. Volatilisation of pesticides was also shown to be reduced up to 80% by the adjuvants. A commercial available formulation was able to reduce the volatilisation of pyrimethanil but the formulation of fenpropimorph had only a limited effect on its volatilisation. Further research on the mechanisms is required to fully understand the volatilisation processes and to evaluate the potential of adjuvants types to reduce the volatilisation of pesticides which is an addition to pesticide fate models.

Key words: pesticide, volatilisation, formulation