

Comparison of adjuvants with soil-binding properties to reduce herbicides runoff losses in sugarcane

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Summary Elevated herbicide concentrations coming from sugarcane cropping land may disturb sensitive marine ecosystems already affected by other pressures such as climate change. To mitigate its impact and maintain its productivity, the Sugar industry has been looking at innovative options to reduce the movement of herbicides off site. Three different oil-based adjuvants (Grounded® applied at 3L/ha, Atpolan® soil Maxx applied at 0.4L/ha and Ad-Here™ applied at 1L/ha), a terpene-based adjuvant (Flexend® applied at 1.2L/ha) and a polyol-based adjuvant (Watermaxx®2 applied at 9.35L/ha), have been tested on tilled plant cane and untilled bare soil or trash blanketed ratoon for their potential to reduce runoff losses as well as improving the weed control efficacy of four registered pre-emergent herbicides applied at full label rate: imazapic (96g/ha), hexazinone (975g/ha), isoxaflutole (150g/ha) and amicarbazone(700g/ha). Herbicide efficacy trials were implemented as randomised complete blocks with three replicates and adjacent untreated controls. Herbicide loss in runoff was monitored using replicated rainfall

simulations, delivering 80mm of simulated rain, 48h or three weeks after herbicide application. None of the tested adjuvants significantly increased herbicide efficacy on weeds in the efficacy trials. On green cane trash blanket, all adjuvants did not affect or significantly increased the runoff of the tested herbicides, except the Watermaxx®2 which non-significantly reduced the runoff by up to 21% when the rain occurred 48h after herbicide application. On tilled bare soil (plant cane), Grounded®, Atpolan® soil Maxx and Watermaxx®2 significantly reduced herbicide runoff losses when rain occurred 48h after application, with Grounded® achieving the best performance (17 to 40% herbicide runoff losses reduction) across all tested herbicides. On untilled bare soil (ratoon), Grounded® added to the spray tank did not decrease herbicide loss via runoff. This study identified the adjuvant Grounded® could reduce the environmental impact of pre-emergent herbicides in tilled plant cane.

Keywords Great Barrier Reef, herbicides, runoff, sugarcane, adjuvant