The Effect of Adjuvants in Reducing Potential Spray Drift

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**Abstract.** Drift containment during spray application of plant protection products is essential to achieve sustainable pesticide application accomplishing the EU directives and strategies. Adjuvants are designed to perform specific functions involving the mixing and application of pesticides (i.e. buffering, dispersing, emulsifying, spreading, sticking, and wetting), but they can also reduce evaporation, foaming, volatilization, and spray drift. Interest in using adjuvants as an additional tool to increase the spray application efficiency, by concurrently increasing the spray deposition and reducing the spray drift risk, is on the rise as the European Green Deal, within the Farm to Fork strategy, strives to reduce by 50% the overall use of agrochemicals within 2030. In this context, laboratory trials aimed to measure the capability of different adjuvants to reduce potential spray drift were performed.

Two commercial adjuvant formulations were tested separately at two dosages (minimum and maximum according to their label) and mixed with pure water. Also, three types of nozzles were considered in this study: conventional hollow-cone and flat fan nozzles, and air-inclusion flat fan nozzles. The effect of adjuvants on the obtained droplet size spectra (accounting for VMD, D10 and D90) were measured using a Malvern laser diffraction system. Furthermore, adjuvants effect on potential spray drift was evaluated measuring the distortion of single nozzles spray patterns. For these purposes, an ad hoc designed “wind-tunnel horizontal patternator” was used to generate a controlled cross-airflow to the nozzle spray and concurrently measure its spray pattern when adjuvant mixtures were sprayed. Pure water was used as a spray liquid reference for the evaluation of (i) changes in droplet size spectra and (ii) the potential spray drift reduction attributable to the adjuvants.

Both tested adjuvants increased the droplet size spectra of the three types of tested nozzles to a different extent, in the range of 10-70% for the VMD. The variation of droplet size spectra was reflected in the reduction of potential spray drift, which ranged between 20 and 60%. Also, the air inclusion nozzle type showed less benefit in using adjuvants if compared to the conventional nozzles. Finally, the adjuvants dosage generally did not affect considerably either the droplet size or the drift reduction figures.