

Abstract Submitted
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Drop impact experiment as a model experiment to investigate the role of oil-in-water emulsions in controlling the drop size distribution of an agricultural spray CLARA VERNAY, LAURENCE RAMOS, CHRISTIAN LIGOURE, Laboratoire Charles Coulomb, UMR5221, Université Montpellier 2 et CNRS, France, JEAN-PAUL DOUZALS, Irstea, UMR ITAP, Montpellier, France, RAJESH GOYAL, R&D Novacare, Solvay, Bristol, USA, JEAN-CHRISTOPHE CASTAING, R&D Novacare, Solvay, Aubervilliers, France — Agricultural spraying involves atomizing a liquid stream through a hydraulic nozzle forming a liquid sheet, which is then destabilized into droplets. Solution adjuvants as dilute oil-in-water emulsions are known to influence the spray drop size distribution. To elucidate the mechanisms causing the changes on the drop size distribution, we investigate the influence of emulsions on the destabilization mechanisms of liquid sheets. Model laboratory experiments based on the collision of a liquid drop on a small target are used to produce and visualize liquid sheets. With emulsion, the sheet is destabilized by the nucleation of holes in the sheet that perforate it during its expansion. The physico-chemical parameters of the emulsion, such as the concentration and the emulsion drop size distribution, are varied to rationalize their influence on the destabilization mechanisms. The results obtained with the drop impact experiments are compared to the measurement of the spray drop size distribution. The very good correlation between the number of nucleation events and the volume fraction of small drops in the spray suggests that experiments on liquid sheet are appropriate model experiments to gain an understanding of the physical mechanisms governing the spray drop size distribution.

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