

Title Characterising the Washing Processes of Vegetables and Potatoes
Author E. Mulugeta and M. Geyer
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Abstract

Experiments were conducted to investigate the interdependence between the different influencing factors on the spray washing process under low-pressure conditions. The washing effect as a function of standoff distance, spray pressure, and nozzle diameter is derived by considering the spray structure and the spray washing mechanism. Four measuring systems were used to determine the relevant spray structure parameters of different nozzles and their washing effects. Single droplets formed in the spray were submitted to an energetic assessment. The nozzles were evaluated with regard to their area washing performance η as a ratio of the effective erosion area to spray area and effectiveness $E_{s,ve}$.

The agricultural nozzle for plant protection with a flow rate Q lower than 3 l min^{-1} at pressure p of 3 bar and a spray angle $\alpha_{h=0}$ of 90° was found to be ineffective considering the determined area washing performance (area ratio $\eta=0.10$) as its spray parameters proved to be inappropriate concerning the droplet size spectrum, volume intensity per unit area, and mean impulse distribution. Conversely, the flat-fan nozzle with a flow rate Q of 6.2 l min^{-1} at pressure p of 3 bar and a spray angle $\alpha_{h=0}$ of 90° produces a spray with a satisfactory area washing performance (area ratio $\eta=0.91$), but a smaller area washing effectiveness $E_{s,ve}$ for the spray conditions used in this experiment.