Eggplant, Solanum melongena L., holds significant agricultural importance globally, valued for its fruit which is predominantly utilized as a vegetable (Rotino et al., 2023). In Iraq, eggplant cultivation is substantial, with an estimated 54,469 don (1 don=2500 square meters) in cultivated area in 2020, particularly prominent in the Basrah province, contributing 3,992.9 tons to the total production in an area of 8,514 km² (CSO, 2020). Greenhouse cultivation enables year-round eggplant production, requiring bed preparation in October and subsequent insecticide applications depending on the prevalent pests (FAO, 2003). Insecticide use is crucial in eggplant cultivation (Prado-Lu, 2015), particularly to combat *Tetranychus urticae* Koch, a major pest in greenhouse eggplant cultivation (Jakubowska et al., 2022). Despite pesticide application, some insects survive and reinfect fields post-treatment, reducing pesticide efficacy (Sanchez-Bayo, 2021).

Commonly, insecticides such as dichlorvos and occasionally sulfur are utilized for pest control in greenhouse crops. Dichlorvos is approved for use on vegetative crops without detrimental effects on plant growth (Wang et al., 2022). The correlation between active ingredients and their concentrations is crucial for effective pest control while minimizing environmental harm (EPA, 2024).

Optimal *T. urticae* control is achieved by directly spraying eggplants at a specific height above the plant’s upper surface (Alper et al., 2019). Canopy coverage poses a significant challenge to *T. urticae* control (Whitehead, 2017), as insufficient droplet penetration may leave some vegetation inadequately covered. Insufficient coverage limits *T. urticae* movement under leaf surfaces (Yeary et al., 2018; Lewis and Hamby, 2020).

Achieving sufficient spray droplet coverage percentage is paramount for effective pest control (He et al., 2022), influenced by the plant canopy structure, plant species, and growth stage (Musiu et al., 2019). In eggplants, insecticide coverage varies significantly during plant development, with reduced deposition at lower canopy layers compared to upper layers (Hua et al., 2020; Abraheem and Alheidary, 2022; Ibraheem and Alheidary, 2023). Reduced canopy protection may diminish insecticide exposure, uptake, and efficacy (Prado-Lu, 2015). Strategies to enhance spray penetration through plant canopies include increasing application volume and altering nozzle orientation (Derksen et al., 2008; Foque et al., 2012; Ibraheem and Alheidary, 2023). While nozzle type had minimal impact in a direct application study, increasing application volume potentially improved control efficacy. Nozzle effectiveness is also influenced by spray solution formulation, affecting canopy penetration (Alheidary et al., 2014; Sijs and Bonn, 2020).