

Experimental Analysis of Flight Altitude for Enhanced Agricultural Drone Spraying Performance

Abstract

Effective rice field management and the proper application of agricultural chemicals are crucial for ensuring agricultural product quality. These chemicals control weeds and protect against insect pests, which can harm crop yields and quality. This research explores the relationship between the altitude at which agricultural drones spray chemicals, spray uniformity, and chemical dispersion. The study assesses drone operations at heights of 1m, 1.5m, and 2m above hollow cone nozzles in 2.8m/s wind conditions. It aims to evaluate droplet uniformity and dispersion on water-sensitive paper placed on paddy plants, analyzed with ImageJ software. Results show that at 1.5m height, there's a significantly higher average droplet density, with 162.7 deposits/cm² in the upper region and 161.8 deposits/cm² in the lower region. Additionally, coverage is notably increased, at 55.21% for the upper region and 51.4% for the lower region. This research highlights the importance of optimal drone altitude for efficient chemical application in rice fields, improving crop protection and yield.

Keywords

Agriculture drone; Droplet density; Spraying system