

Title An In-Line Monitor for Evaluating Dust Generation from Nut Harvesting Equipment
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Abstract

Generation of dust from almond harvesting is an increasing problem and continues to be a focus of regulatory activity. Filter deposition measurements of airborne particulate matter (PM10 and PM2.5) are time consuming and expensive; this limits the number of experiments that can be executed and focuses on regional measurements. The hypothesis of this study was that dust load from a nut harvester fan exhaust could be measured as opacity or light extinction. An in-line light transmission sensor was installed on a harvester to provide real-time information on dust generated during harvest activities of nuts. The light-based device was calibrated using Arizona test dusts (graded based on particle size); standard gravimetric devices for measuring PM10 and PM2.5 were also used for comparative purposes. The measurement system allowed a fast, low cost evaluation of changes in machine design, operation and other cultural factors. Initial studies found dust generated during harvest activities to be linked to differences in windrow material, soil type, and machine operation. The goal of the study was to guide growers and manufacturers on design modifications of equipment that may reduce dust generation during nut harvesting. This study initiates a measurement system that can provide immediate qualitative and quantitative feedback on these operations and enhance grower knowledge of management tools that will minimize dust during harvest operations.