Establishment of Newer PM 2.5 Emission Factors with Various Almond Harvesting Machinery

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PROJECT SUMMARY

Objectives for current year:

- Determine newer PM2.5 emission factors from low-emissions harvesting equipment
- Compare emission factors between newer and old harvesting machinery from major manufacturers, and
- Report on the percentage reduction in emission factors from newer machinery

Background and Discussion:

There is a need for new $PM_{2.5}$ (particulate matter less than 2.5 micrometers in size) emissions data from almond harvesting operations primarily in preparation for the new $PM_{2.5}$ State Implementation Plan (SIP) in California. To encourage the use of newer almond harvesting equipment with reduced dust emissions during harvesting, incentive programs are being devised. The correct implementation of this incentive program requires newer, more accurate, and comparative PM data from those machines. An updated PM emissions inventory in California is also necessary to evaluate the state's attainment for the new $PM_{2.5}$ regulations. The use of old harvesting equipment coupled with the increased acreage of almond orchards contributes significantly to the $PM_{2.5}$ emissions inventory.

Previous PM_{10} and $PM_{2.5}$ data are not quite consistent due to the level of knowledge more than a decade ago. Newer updated dispersion models are now in place such as AERMOD, including newer EPA and CARB approved FRM (Federal Reference Method) PM_{10} and $PM_{2.5}$ samplers. Newer harvest machinery may not have used these techniques and approved samplers to measure PM emissions. A PM measurement protocol must be established and agreed upon by all parties concerned and must be comparable and standardized for future regulatory changes.

Key data generated by this study is the $PM_{2.5}$ emission factors for the old and new harvesters using the recent dispersion modeling tools (AERMOD) and newer EPA approved FRM samplers. Related results are the estimated emission rates from the machineries tested. Further analysis of data includes report of emissions concentration as well as comparison with the national ambient air quality standards (NAAQS). Finally, the collection of dust particles as well as particle size distributions evaluation will report on the efficiency of harvest of newer harvest machinery. Limited results will include PM_{10} and TSP (Total Suspended Particulates) data and ratio of PM_{10} to $PM_{2.5}$.

Project Cooperators and Personnel: ESJVAD; Almond Harvest Machinery manufacturers (Flory, Weiss-McNair, Jack Rabbit, and Exact); Double E Farms, Inc.

For More Details, Visit

- Poster location 54, Exhibit Hall A + B during the Almond Conference; or on the web (after January 2018) at Almonds.com/ResearchDatabase