



Safe European fruit from a healthy environment

Minimizing environmental impact of pesticides and residues on fruits

Marcel Wenneker¹, Jan van de Zande² & Mette E. Poulsen³
e-mail: marcel.wenneker@wur.nl; jan.vandezande@wur.nl; mpou@food.dtu.dk

Introduction

In the EU-FP6 ISAFRUIT project a Crop Adapted Spray Application (CASA) system for precision orchard protection was developed. The system consists of three components:

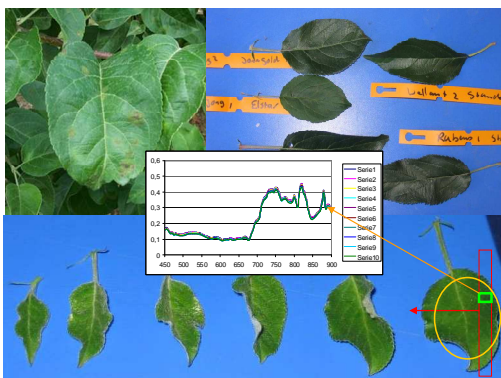
- Crop Identification System (CIS): adjusting spray application to the target characteristics, i.e. the fruit tree.
- Environmentally Dependent Application System (EDAS): adjusting spraying equipment according to the environmental circumstances.
- Crop Health Sensor (CHS): identification of tree health status determining pesticide application.

Crop Health Sensor

To develop the CHS spectral analysis has been used based on the crop sensing techniques for grasslands and arable farming.



Field watcher device to measure spectral reflection with two cameras (400-900nm and 900-1600nm wavelength) used to measure individual apple leaves in the laboratory.



Apple leaves were scanned in lines (1mm x 1200 mm) for spectral reflection. With two cameras the areas of difference in reflection between cultivars, healthy leaves and apple scab infected leaves were determined.

Application technique and reduced pesticide use

Application techniques (i.e. sprayer type, sprayer settings and nozzle type), crop architecture and growth stage have all shown to affect variability in deposit and residues in fruits. Different components of the CASA-system have been evaluated for deposition and residues on fruits.

CASA-sprayer



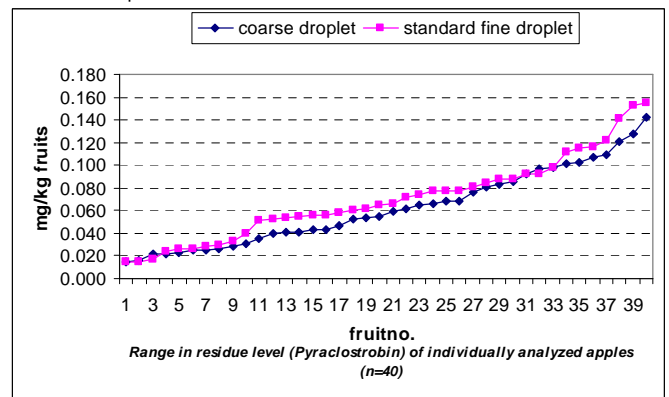
The EDAS and CIS components on the current sprayer are used to: avoid spray drift, improve spray deposition, and to reduce pesticide input. Drift reduction is achieved by means of coarse droplet application, adaptation of the spray volume and air settings to the tree shape and position in the orchard.

Residue trials

In field trials the effect of coarse droplet and standard fine droplet applications were studied. Apple trees were sprayed according to farmers practice. At harvest fruits were picked and individually analyzed for the presence and levels of residues.

Results and discussion

First results showed that residue levels were below MRL, ADI and ARfD. The variation in residue levels between individual fruits was high. This variation was comparable for coarse and fine droplet application. The use of coarse droplets does not increase the residue levels.



Conclusions

Results indicate that:

- No differences occur in average residue levels between fine and coarse droplet applications.
- Large variations in residue levels between fruits, independent of used nozzle type (Fine/Coarse droplet size).
- Adjustment of dosage on tree/leaf volume, and reduction of the variation in spray deposit (residue) must be realized with the CIS component on the sprayer.

¹ Applied Plant Research
P.O. Box 200
6670 AE Zetten
The Netherlands
Tel.: +31 488473745
Fax: +31 488473717
Internet: www.ppo.wur.nl

² Plant Research International
P.O. Box 16
6700 AA, Wageningen
The Netherlands
Tel.: +31 317480688
Fax: +31 317423110
Internet: www.pri.wur.nl

³ Technical University of Denmark
National Food Institute
Moerkhoej Bygade 19
DK-2860 Soeborg
Tel.: +45 72347463
Fax: +45 72347448
Internet: www.food.dtu.dk

