Plant Protection Products: Adhesion to and distribution on treated seeds

Patricia DE VOS, Aurore DINEUR and Olivier PIGEON
Walloon Agricultural Research Centre (CRA-W), Agriculture and Natural Environment Department, Plant Protection Products and Biocides Physico-chemistry and Residues Unit, Carson Building, Rue du Bordia 11, B-5030 Gembloux, Belgium (p.devos@cra.wallonie.be)

1. Introduction
Seed treatment with fungicides and insecticides is used to protect crops against pests and diseases. To ensure a good efficacy, each seed, hence each plant, has to be correctly treated.
Good quality seed treatment with plant protection products means that the average concentration of active substance on seeds has to be as close as possible to the target rate and that the distribution of the active substance on individual seeds has to be uniform.
To test the quality of seed treatments, several standard methods are now available and recommended, and other additional methods can be proposed.

2. Standard methods

CIPAC METHOD MT 175
Treatment of seeds with the laboratory seed treatment machinery Hege 11
Seed treatment apparatus
Treatment of seeds
Seed-to-seed uniformity of distribution of the pesticide (analysis of 100 individual seeds)
colorimetrically (dye concentration on each seed) or by active substance analysis (recommended by our laboratory)

CIPAC METHOD MT 194
Seed loading and adhesion to the treated seeds after a controlled dropping stress
colorimetrically (dye concentration on each seed) or by active substance analysis (recommended by our laboratory)
Principle:
5 fallings of treated seeds and seed loading analysis to compare seed treatment between a stressed and an unstressed sample.

HEUBACH METHOD
Heubach dustmeter or equivalent to determine the particulate matter (dust content) of treated seeds.
Following encountered problems of eco-toxicity coming from dust of treated seeds, some regulatory authorities require a test to evaluate the amount of dust sent out during sowing.

ANALYTICAL METHOD
Our laboratory recommends the active substance analysis using a chromatographic determination (HPLC-DAD, UHPLC-DAD or GC-FID).

3. Additional methods

Example of chromatogram of a calibration solution
Example of chromatogram of a treated sample
Every method used to analyse treated seeds has to be validated on its specificity (blank, untreated seeds), repeatability (of injections, of the method), linearity, accuracy (efficacy of extraction, recoveries), LOQ, stability of a.s. in standard and sample solutions during analytical phase.

4. Conclusion
This range of tests permits to ensure the quality of the treated seeds, hence the protection of each plant, and a reduced impact of seed treatment products on the environment.