Smart seed coating and pelleting

Presentation ISTA
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At the Floriade, Venlo
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Seed coating & pelleting

<table>
<thead>
<tr>
<th>Type</th>
<th>Weight Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basis coat</td>
<td>0.2-2%</td>
</tr>
<tr>
<td>Complete film coat</td>
<td>3-20%</td>
</tr>
<tr>
<td>Encrusting</td>
<td>100-500%</td>
</tr>
<tr>
<td>Mini pill</td>
<td>100-2500%</td>
</tr>
<tr>
<td>Standard pill</td>
<td>1500-10000%</td>
</tr>
</tbody>
</table>
Why seed coating?

- Improve plantability of seeds
  - Small seed
  - Irregular shaped

Onion

Lettuce

Ribbon seeder

Drum seeder
Film Coating Equipment

- Without drying
  - Batch coating drum
  - Continuous coating drum
  - Rotary coater

- With post-drying
  - Batch coating drum
  - Rotary coater

- With simultaneous drying
  - Fluid bed coater
  - Pan coater
  - Rotary dry coater
Encrusting & Pelletizing Equipment

- Batch coating drum
- Rotary coater
  - Manual
  - Automated
What is new?
Why seed coating? More

- Improve seed quality
  - Human and seed safety
  - Improve seed to seed distribution
  - Optimize release
  - Dust control
  - Marketing tool
Seed to seed distribution

![Graph showing seed to seed distribution for Method 1 and Method 2. The x-axis represents the active ingredient (mg/seed) ranging from 0.50 to 1.00, and the y-axis represents the number of seeds (#). The graph shows two bell curves, one for each method. Method 1 is represented by a red line, and Method 2 is represented by a green line. The curves peak at around 0.80 mg/seed.](image-url)
Marketing tool (Visual appearance)
Why seed coating? More

- Create carrier for actives
  - Plant protection products
  - Micro nutrients
  - Growth stimulants
  - Micro organism

![Diagram of seed coating layers]

- Fungicide 1
- Coating layer
- Fungicide 2
- Coating layer
- Insecticide
- Finishing layer
- Color
Classical example

Untreated

Coated with Fungicides
Systemic insecticides

- Neonicotinoids (Gaucho, Cruiser, etc)
- High rates
- Full season protection
- Phytotox issues lab germination test
Nematode control

- Avicta Complete
- Old chemistry, abamectine
- New application on seeds
- Crops
  - cotton
  - Corn
  - soybean
Snail control, trials PPO

Untreated seeds

Treated seeds with different molluscicides
Micro Organism application

- Rhizobium technology very old
- Lack of shelf life
New directions

- New MO strains
- Endofytes
- Dry NFO formulations
New: Nematicide

- VOTiVO
- Seed treatment
- Bacillus firmus (Strain I-1582)
- Combination with Poncho
- Corn, soy bean, cotton

Lance nematodes in root
Photo courtesy of Iowa State University

From www.votivo.us
Genius wheat (Humic acid)

Yield increase

Independant trial points
Film coating

- Functional coatings
  - Traceability
  - Pollinator Plus
  - Smart Release
Traceability

- Visible markers
- Invisible markers
- Sound markers
- Chip markers
Invisible marker technology
What is Pollinator Plus?

- Patented polymer coated on Corn from Landec Ag
- Regulates water uptake
- Delays germination
- Increases heterogeneity
- Synchronization flowering
- Reduces risks hybrid seed production
IntelliCoat® Technology

- Crystalline
  - Impermeable to water

- Amorphous
  - Permeable to water

IntelliCoat Corporation/Landec Ag
Pollen Shedding LH168

Control

Coat B
Pollen shedding LH 168

Percentage of plants

0 10 20 30 40 50 60 70 80 90 100


- Control
- Coating A
- Coating B
Effect on quality testing!

Pol A 1.5 %  Control
Smart release with seed coating

- Already a wish for a long time within the seed coating world
- Limited option due to water permeability of coating
- Limited option due to thin layer

- What is new?
- Smart technology
Standard Sanokote

Standard Splitpill
+ Sanokote Smart
Release of a.i from different coatings (0.8 mg ai/seed) in free water at 20°C
Aphid control with Smart coating
Field crop encrusting

- Limited seed space
- Increase number of PPP and additives
- Proper plantability

- Improved encrusting technology
- Efficient drying
- Weight increase without drying
Encrusting canola without drying
Seed quality testing

Innovations in seed coating may lead to the need of additional seed quality testing methods and norms:

- Adjusted norms for standard germination tests
  - PPP application
  - Pollinator Plus
- Recovery of active ingredients
- Distribution of active ingredient per seed
- Release of active ingredients
- Determination of beneficial micro-organisms
  - May affect pathogen tests
- Dust measurements
Trends in seed coating

- Strong, growing attention in seed applied actives
- Increasing application of multiple actives and rates
- Increasing quality release (no dust, time release)
- Increasing need for customized formulations
- Growing need accurate and safe application
- Growing need for automation
- Increasing quality demand from growers
Thank you for your attention