Infinito, a novel high performance fungicide with an ICM profile to control late blight in tomatoes and potatoes.
BCS Fungicides introduced into China

Development | Launch | Growing | Maturity | Declining | End
---|---|---|---|---|---

- Kalaili 840SL
- Infinito 687.5SC
- Horizon 430SC / Raxil 60FS
- Sportak 450 EW / Sporgon 50WP
- Antracol 70WP
- Scala 400SC
- Previcur N 722AS / Rovral 500SC
- Bayleton 25WP
- Melody Duo 66.8WP
- Hinonsan 400EC
- Baytan 25DS

2 molecules

- 2005
- 2000
- 1995
- 1990
- 1985
- 1980

Guo JQ (PhD), BCS China Development
Presentation • May 2, 2008 • Slide 2
# BCS Fungicide Product Portfolios in China

<table>
<thead>
<tr>
<th>Products</th>
<th>Oomycete diseases</th>
<th>Leaf sports</th>
<th>Botrytis grey mold</th>
<th>Powdery mildew</th>
<th>Antracnose</th>
<th>Wheat rusts</th>
<th>Rice blast</th>
<th>Crop smuts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infinito 687.5SC</td>
<td>+++</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kalaili 840SL</td>
<td>+++</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Previcur 722AS</td>
<td>+++</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Melody Duo 66.8WP</td>
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<td>+++</td>
<td></td>
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<td></td>
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<tr>
<td>Antracol 70WP</td>
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<td>+++</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Horizon 430SC</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Rovral 500SC</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>+++</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scala 400SC</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Sportak 450EW</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>+++</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sporgon 50WP</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>+++</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bayleton 25WP</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>++</td>
<td>++</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raxil 60FS</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td></td>
<td>+++</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hinonsan 400EC</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td></td>
<td>+++</td>
<td></td>
<td>+++</td>
</tr>
</tbody>
</table>

+++ : Excellent; +++ : Good; ++ : Acceptable; + : not good. 

Guo JQ (PhD), BCS China Development
Presentation • May 2, 2008 • Slide 3
Fluopicolide is a new molecule in the Chemical class of Acylpicolides with a specific mode of action & high bioactivity which differs to the available Oomycete fungicides.
• Highly effective oomycetes fungicide for use in potatoes, grapes and vegetables
• Novel mode of action - no cross resistance (spectrin delocalization)
• Fast acting and long-lasting activity
• Consistently high level of disease control
• Favorable profile for the food chain

The new standard for oomycetes control
Infinito - A modern tool for IPM / ICM

- Low acute toxicity (oral, dermal, inhalation)
- Not carcinogenic / mutagenic
- No developmental or reproductive toxicity
- Non-toxic to birds, bees, silkworm & non-target organisms
- Not toxic to aquatic organisms practically
- No residues in potatoes

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute oral</td>
<td>&gt;2500</td>
</tr>
<tr>
<td>Acute dermal</td>
<td>&gt;4000</td>
</tr>
<tr>
<td>Inhalation</td>
<td>&gt;3195</td>
</tr>
<tr>
<td>Eye sensitivity</td>
<td>Non</td>
</tr>
<tr>
<td>Skin sensitivity</td>
<td>Non</td>
</tr>
</tbody>
</table>
Biochemical Mode of Action

Effect on spectrin-like proteins

Redistribution of spectrin-like proteins (immuno-localized with fluorescence microscopy)

A unique mode of action which is not observed with other Oomycete fungicides

Guo JQ (PhD), BCS China Development
Presentation • May 2, 2008 • Slide 7
In the lifecycle of *P. infestans*

**Biological mode of action**

- **Protective efficacy**
  - Germination
  - Germ tube elongation
- **Curative efficacy**
  - Penetration-Colonization
    - (Formation of haustoria)
- **“Eradicative” efficacy**
  - Indirect germination - Zoospore release
    - Zoospore mobility
    - Cyst germination
    - Penetration
  - Sporulation
    - (conidiophores & conidia)
- **Anti-sporulation**
- **Direct germination of sporangia**
  - Sporangia germination
  - Germ tube penetration

**Fluopicolide**

*A new standard for Oomycete disease control*

Guo JQ (PhD), BCS China Development

Presentation • May 2, 2008 • Slide 8
### Biological Spectrum

<table>
<thead>
<tr>
<th>Plant Group</th>
<th>Pathogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brassicas</td>
<td><em>Peronospora parasitica</em></td>
</tr>
<tr>
<td>Cucurbits</td>
<td><em>Pseudoperonospora cubensis</em></td>
</tr>
<tr>
<td>Lettuce</td>
<td><em>Bremia lactucae</em></td>
</tr>
<tr>
<td>Onions</td>
<td><em>Peronospora destructor</em></td>
</tr>
<tr>
<td>Peppers</td>
<td><em>Phytophthora capsici</em></td>
</tr>
<tr>
<td>Potato</td>
<td><em>Phytophthora infestans</em></td>
</tr>
<tr>
<td>Roses</td>
<td><em>Peronospora sparsa</em></td>
</tr>
<tr>
<td>Tobacco</td>
<td><em>Peronospora tabacina</em></td>
</tr>
<tr>
<td>Tomato</td>
<td><em>Phytophthora infestans</em></td>
</tr>
<tr>
<td>Vines</td>
<td><em>Plasmopara viticola</em></td>
</tr>
</tbody>
</table>

### Late blight  
### Downy mildew  
### Damping-off
Effect of Fluopicolide on *P. infestans* Zoospores

A: control represents zoospores treated with solvent (1% DMSO);

B: zoospores treated with fluopicolide at 3ppm, 10 minutes post treatment.
Assessment of the lesion size: 8 days after treatment (treatment done 20 h after inoculation)
Lab Test: New Growth Protection

Lab trial in France / 2002; 2 sprays at 24h and 72 h after inoculation respectively.

% Infected leaf area of new shoots
6 DAT

- Untreated: 43.8
- Infinito 1,2: (+) 3.3
- Acrobat 2,0: ?
- Ranman 0,2: ?
- Shirlan 0,4: ?
- Pulsan 2,5: ++

(oxadixyl+cymoxanil+mz)

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Presentation • May 2, 2008 • Slide 12
Positioning against Potato Late Blight

- 2-3 sprays at rate of 1.2-1.6L/ha
- Started from the flowering period
- At the interval of 7-10days
Leaf Blight Performance in Europe

RAUDPC

29 efficacy trials

(Efficacy on leaves in 29 trials in 2002-2004)
Field performance against late blight in Europe

UTC  Cymoxanil / mancozeb - fluazinam  Infinito
Late Blight Fungicide Rating at EuroBlight Workshop (Bologna, Italy) 2007

Late blight fungicide ratings Bologna 2007

<table>
<thead>
<tr>
<th>Product</th>
<th>Effectiveness</th>
<th>Action mode</th>
<th>Mobility in the plant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Leaf blight</td>
<td>New growing point</td>
<td>Stem blight</td>
</tr>
<tr>
<td><strong>Provisional / New product</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>propamocarb</strong></td>
<td>+++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>bentiavalicarb-isopropyl + mancozeb</td>
<td>+++</td>
<td>?</td>
<td>+(+) L</td>
</tr>
<tr>
<td>Curzate</td>
<td>++(+)</td>
<td>?</td>
<td>+(+)</td>
</tr>
<tr>
<td>Acrobat</td>
<td>++(+)</td>
<td>?</td>
<td>+(+)</td>
</tr>
<tr>
<td>Ranman</td>
<td>+++</td>
<td>?</td>
<td>+</td>
</tr>
<tr>
<td>Frowncide</td>
<td>+++</td>
<td>?</td>
<td>+</td>
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</tbody>
</table>

Infinito 687.5SC (fluopicolide + propamocarb) received the best rating among the late blight fungicides.
**Infinito** against *Cucumber downy mildew (CDM)*
Conclusion:

- Infinito has consistently shown the best efficacy against CDM at rates of 516-773gai/ha under heavy disease infection.
- Infinito has shown the better curative activity than Previcur, Cymoxanil & Dimethomorph at the recommending doses.
### Field Performance in Guangdong 2004

<table>
<thead>
<tr>
<th>Water</th>
<th>Dimethomorph 50%WP Cymoxanil 72%WP</th>
<th>Inifinito 687.5 SC</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Field performance of Water" /></td>
<td><img src="image2" alt="Field performance of Dimethomorph 50%WP Cymoxanil 72%WP" /></td>
<td><img src="image3" alt="Field performance of Inifinito 687.5 SC" /></td>
</tr>
</tbody>
</table>
**Infinito** against Tomato Late Blight (TLB)
Average Efficacy of Infinito against **TLB** of 4 trial in China

**Conclusion:**
- Infinito has consistently shown the best efficacy against TLB at rates of 60-75ml/mu under heavy disease infection.
- Infinito has shown the better curative activity than Previcur, Cymoxanil & Dimethomorph at the recommending doses.
Field Performance in Shandong 2005

Cymoxanil

Dimethomorph

UTC

Infinito
Infinito positioned as a curative Oomycide against tomato late blight & cucumber downy mildew in China

Efficacy %

Untreated % infection

- untreated
- Infinito 619gai/ha (60ml/mu)
- Infinito 773gai/ha (75ml/mu)
- Cymoxanil 1648gai/ha (156g/mu)
- Dimethomorph 225gai/ha (30g/mu)

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Infinito against Potato Late Blight (PLB)
Results on tuber blight (14 days after storage) in Sichuan 2006

Diseased tubers in Untreated: 15.44%
Infinito Field Performance in Sichuan 2006

Infinito

Local Standard
INFINITO – Potato Late Blight protection

Results on leaf blight in Yunan 2007

<table>
<thead>
<tr>
<th>DATE</th>
<th>5.29</th>
<th>6.5</th>
<th>6.13</th>
<th>6.20</th>
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<tbody>
<tr>
<td>Severity (UTC)</td>
<td>0</td>
<td>0.23</td>
<td>11.2</td>
<td>62.4</td>
</tr>
<tr>
<td>Infinito</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Antracol+Infinito</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metalaxyl+MZ</td>
<td></td>
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</tr>
</tbody>
</table>

Efficacy(%)

2 Infinito
619 gai/ha
773 gai/ha
1575+619 gai/ha
1575+773 gai/ha

1 Antracol +2 Infinito
1575+619 gai/ha
1575+773 gai/ha

2 Antracol +1 Infinito
1575+773 gai/ha

3 Metalaxyl+MZ
1044 gai/ha

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Infinito Field Performance in Yunan 2007

Infinito 1.125L/ha
Antracol followed by Infinito

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Field Performance in Yunnan 2007
Geographic Distribution of Potato Culture & Key Diseases

**North region: Single season**
- Heilongjiang: late blight;
- Inner Mongolia: late blight (dominant) + early blight
- Gansu: early blight (dominant) + late blight

**Central region: 2 seasons**
- Shandong, Henan & Anhui
- Late blight (dominant) + early blight

**South: winter Cropping**
- Guangdong, Guangxi, Hainan
- Late blight;

**South-west: 1-3 seasons (mixed cropping)**
- Sichuan, Yunana, Guizhou, Tibet
- Late blight;
Use Patterns of INFINITO On Potato in China

- **INFINITO (2-3 foliar sprays)**
  - Straight spray
  - Package spray
  - Tank-mixture spray

- **ANTRACOL followed by INFINITO**
  - Early blight + late blight

- **ANTRACOL + INFINITO**

---

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Successful Launch of Infinito 687.5SC in China 2006

1. Registered in China 2005, as the first registration worldwide;

2. Launched on cucumber and tomato against downy mildew & late blight in 2006-2007;

3. To be launched on potato, watermelon, chili and crucifer vegetables in 2009.
Thank You for Your Attention!