SESSION 4: PART 1

Fertiliser Solutions for the Future

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5th September 2023
Outline

- Incitec Pivot Fertilisers
- Fertiliser solutions for the future
  - Nitrogen Inhibitors – reducing emissions, maintain yield
  - Bio Ferts – recycling nutrients from waste streams
  - Green solutions of the future
Incitec Pivot Fertilisers

IPF is Australia’s largest distributor of fertilisers

3 Manufacturing facilities
17 Primary distribution centres (PDC)
2 Soil and plant testing Lab
9 Export regions
>800kt Fertiliser Storage
>1mt Produced
>2mt Distributed
Enhanced Efficiency Fertilisers
Nitrogen Inhibitors

Minimise nutrient losses and GHG emissions – maximise yield

- **Nitrification Inhibitor**
  - Reduces N₂O emissions – **by up to 90%**
  - Slows conversion of ammonium to nitrate
  - Increased Yield
  - Reduced fertiliser rate for same yield

- **Urease Inhibitor**
  - Reduces NH₃ emissions
  - Slows conversion of urease to ammonium
  - Increased Yield
  - Reduced fertiliser rate for same yield
Nitrogen Cycle & loss pathways

- N\textsubscript{2}O is a GHG, with GWP of ~273 times more than CO\textsubscript{2}.
- N\textsubscript{2}O is cause of Ozone layer depletion.
- Accounts for 5-7% of GHG emissions in Australia.
- 80% of IT from agricultural practices.

Nitrogen Cycle

- CO(NH\textsubscript{2})\textsubscript{2} → NH\textsubscript{4}\textsuperscript{+} → NO\textsubscript{3}\textsuperscript{−}
- Urea → Ammonium → Nitrate
- NH\textsubscript{3} → NO\textsubscript{2} → N\textsubscript{2}O

Air Pollution & Lost Nitrogen

- Fertiliser 100% N
- Crop 50% N
Mitigation of nitrous oxide emissions from furrow-irrigated Vertosols by 3,4-dimethyl pyrazole tetra-methylene sulfone, an alternative nitrification inhibitor to nitrapyrin for direct injection with anhydrous ammonia.

Graeme Schwenke and Annabelle McPherson

T1 = Anhydrous ammonia (AA), T2 = AA + eNpower, T3 = AA + Nitrapyrin (alternative technology)

86% at Gunnedah and 77% at Emerald

Equivalent yields

Reduction emissions are superior performance to alternative (Nitrapyrin) inhibitor
Australia Bio Fert is made from heat-treated, sterilised organic material mixed with balanced mineral nutrients and functional carbon. The mixture is granulated into high quality and easy to apply granules.
The trials continue to validate the farmer value

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Broccoli yield (t/ha)</th>
<th>Lettuce yield (t/ha)</th>
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<tbody>
<tr>
<td>Nil Fertiliser</td>
<td>8.33</td>
<td>48.0</td>
</tr>
<tr>
<td>Farmer Practice</td>
<td>15.98</td>
<td>51.3</td>
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<tr>
<td>ABF B7</td>
<td>18.87</td>
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<td>ABF B5</td>
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<td>56.5</td>
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Reduced GHG emissions, both nitrous oxide and carbon dioxide when Bio ferts and inhibitors are combined

Similar yield compared to standard farming practice
Several key projects identified to deliver future sustainable fertilisers

- **GIBSON ISLAND GREEN AMMONIA**
- **PHOSPHATE HILL SOLAR**
- **RENEWABLE ELECTRICITY & ELECTRIC VEHICLES**
- **PHOSPHATE HILL GREEN AMMONIA**

Inhibitor Technologies and Recycled Nutrients