TRIAL DESIGN

PARTNER: INTERNATIONAL COMMERCIAL PARTNER
LOCATION: STAFFORDSHIRE, UK
YEAR: 2015
CROP VARIETY: PENTLAND DELL
CONDITIONS: RAIN FED

- Potato crops are among the most important energy sources for human nutrition in Europe.
- The UK produced over 5.2 million tonnes of potatoes in 2016.
- The trial, established with a commercial partner, was designed in two stages: the first was a comparison of potassium and magnesium sources, the second was a rate response study.

TRIAL OBJECTIVES

To investigate:

The effect of potassium and magnesium supplied at different ratios and from different sources.

Different K₂O application rates from MOP, SOP and POLY4.

HIGHLIGHTS

UP TO 16% OVERALL YIELD IMPROVEMENT

ECONOMIC ALTERNATIVE FOR THE FARMER

TUBER DRY MATTER MAINTAINED

TREATMENT TABLE (kg ha⁻¹)

<table>
<thead>
<tr>
<th>N</th>
<th>P₂O₅</th>
<th>K₂O</th>
<th>MgO</th>
<th>CaO</th>
<th>S</th>
<th>Cl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>220</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Control+ Kieserite</td>
<td>220</td>
<td>100</td>
<td>0</td>
<td>80</td>
<td>0</td>
<td>37</td>
</tr>
<tr>
<td>MOP</td>
<td>220</td>
<td>100</td>
<td>300</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>MOP+POLY4 (75:25 K₂O)</td>
<td>220</td>
<td>100</td>
<td>300</td>
<td>32</td>
<td>90</td>
<td>101</td>
</tr>
<tr>
<td>POLY4</td>
<td>220</td>
<td>100</td>
<td>300</td>
<td>128</td>
<td>364</td>
<td>407</td>
</tr>
</tbody>
</table>
YIELD SUMMARY (t ha$^{-1}$) 1-3

- Yield improvement of 16% over MOP.
- Substituting POLY4 as a percentage of the potassium source was assessed at the recommended application rate of 300 kg K$_2$O ha$^{-1}$.
- Potassium-magnesium ion antagonism is a common problem for crops that demand high levels of potassium including potatoes.
- Substituting POLY4 for MOP on a potassium basis supports yield improvements by introducing MgO.
- POLY4’s inclusion in the fertilizer plans provided yield improvements of 8–16% over the MOP option.

ECONOMIC SUMMARY 1-4

- Yield improvement of 16% – equivalent of $1551 per hectare, when compared to MOP – offsetting the additional input cost of POLY4 (US$331 improvement margin).
- MOP+POLY4 offers a flexible economic option with the most efficient input cost vs improved returns on crop yield at US$814/ha, when compared to MOP.
**QUALITY SUMMARY**

- POLY4 maintains tuber dry matter at a higher level than SOP and MOP which is important to fry quality.

- Tuber dry matter content responded positively to the reduction in chloride and the additional nutrients supplied from POLY4.

**YIELD SUMMARY**

- POLY4 improves yield through a range of application rates compared to MOP.

- The recommended rate of 300 kg K₂O ha⁻¹ is required for potatoes at this site to achieve optimal yields.

---

1) All plots received 220 kg N ha⁻¹ from AN, 100 kg P₂O₅ ha⁻¹ from DAP; 2) MOP and/or POLY4 supplied 300 kg K₂O ha⁻¹ except for in Control and Control+Kieserite plots; 3) GENSTAT means; 4) Fertilizer prices used are AN (US$203/t), DAP (US$353/t), POLY4 (US$200/t), MOP (US$200/t); 5) GENSTAT regression 6) Potassium fertilizers were applied at rates of 1.0–400 kg K₂O ha⁻¹.