TRIAL RESULTS

CHILLI PEPPER

SICHUAN, CHINA (2015)
**TRIAL OBJECTIVE**

To demonstrate that POLY4 blend options are a practical alternative to SOP blends.

**HIGHLIGHTS**

5% YIELD IMPROVEMENT

12% INCREASE IN FRUIT NUMBERS AND A 5% INCREASE IN FRUIT WEIGHT

QUALITY IMPROVEMENTS SEEN VIA INCREASES IN CAPSAICIN, CAPSAICIN PIGMENT, SOLUBLE SOLID, AMINO ACID AND VITAMIN C CONTENT

SIGNIFICANT DECREASE IN POST-HARVEST SOIL ELECTRICAL CONDUCTIVITY AND NO pH DRIFT

UP TO 13% INCREASE IN LEAF MACRO NUTRIENT CONTENT

VALUABLE IMPROVEMENTS IN RESIDUAL SOIL CALCIUM, MAGNESIUM AND SULPHUR

**TRIAL DESIGN**

PARTNER: SICHUAN ACADEMY OF AGRICULTURAL SCIENCE

LOCATION: SICHUAN, CHINA

YEAR: 2015

- The global fresh chilli pepper market is estimated to be worth US$ 29.45 billion.¹
- China is the leading global producer of chilli peppers producing 15.8 Mt in 2013 which translates into a 39% financial share of the global market.¹
- Hainan, Hunan, Sichuan, Guangdong and Jiangxi are the main provinces accounting for 94% of chilli pepper production in China.²
- Chilli peppers require high amounts of magnesium and potassium from low chloride fertilizer sources.³
- In this trial, four rates of K₂O application (53, 88, 175 and 263 kg K₂O ha⁻¹) were used to compare SOP and POLY4 based blend options.
- At flowering, both the SOP and POLY4 NPK blend plots were given a top dressing of 90 kg N ha⁻¹ from urea.
- The POLY4 option supplies additional magnesium and calcium plus beneficial micro nutrients beyond the SOP based option.
- Plots measuring 15 m² each were used for all treatment and rate combinations.

**TREATMENT TABLE**

<table>
<thead>
<tr>
<th>FERTILIZER</th>
<th>RECOMMENDED RATE (kg ha⁻¹)⁴⁺</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>SOP based NPK</td>
<td>175</td>
</tr>
<tr>
<td>(15:10:15)</td>
<td></td>
</tr>
<tr>
<td>POLY4 based NPK</td>
<td>175</td>
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<tr>
<td>(15:10:15)</td>
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</tbody>
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¹ Source: United Nations Food and Agriculture Organization
² Source: United Nations Food and Agriculture Organization
³ Source: United Nations Food and Agriculture Organization
⁴ Source: United Nations Food and Agriculture Organization
⁺ Source: United Nations Food and Agriculture Organization
The supply of magnesium and calcium coupled with potassium from POLY4 in the blend is more suited to the chilli pepper plant’s needs.

The POLY4 based NPK 15:10:15 blend outperformed the SOP based NPK 15:10:15 blend, with a 5% yield improvement at the recommended 175 kg K$_2$O ha$^{-1}$ application rate.

**YIELD RESULT** (t ha$^{-1}$)$^{5,6,7,8}$

- Capsaicin evolved as a natural anti-fungal (against *Fusarium spp.*) but also acts as a deterrent to mammalian vermin.

- Colour changes from capsicum pigment content largely reflect fruit maturity but delays caused by excess nitrogen nutrition can reduce the formation of the red pigment.

**CHILLI PEPPER QUALITY** (kg ha$^{-1}$)$^{5,6,8,9}$
Fertilizers are soluble salts that can increase soil salinity.

High soil EC inhibits seed germination and a plant’s uptake of water and nutrients.

The SOP based NPK blend demonstrates an increasing soil EC in line with application rate.

Plots that had the POLY4 based NPK blend applied showed a 25% reduction in soil EC, at a recommended 175 kg K₂O ha⁻¹, compared to the SOP based NPK blend.

The post-harvest soil nutrient status demonstrates the value of additional nutrients in the POLY4 based NPK blend.

Enhancing residual soil nutrients can benefit subsequent crops.

The POLY4 based NPK blends showed consistent increases in post-harvest soil nutrient levels at the recommended application rate of 175 kg K₂O ha⁻¹.

Notes: 1) FAO 2013; 2) Provinces identified by The World Vegetable Center based on share of production in China; 3) IFA World Fertilizer Use Manual 1992; 4) GENSTAT means of inputs for 53–263 kg K₂O ha⁻¹; 5) SOP NPK 15:10:15 blend made from urea, TSP and SOP; 6) POLY4 NPK 15:10:15 blend made from urea, MAP, POLY4 and SOP; 7) GENSTAT regression analysis; 8) Top dressing of 90 kg N ha⁻¹ from urea applied at flowering; 9) GENSTAT means. Initial soil analysis: pH 5.2, organic matter 2%, N 69 mg kg⁻¹, P 37 mg kg⁻¹, K 78 mg kg⁻¹, Ca 1710 mg kg⁻¹, Mg 80 mg kg⁻¹, S 65 mg kg⁻¹, EC 0.104 mS cm⁻¹.