

TRIAL RESULTS

TEA

SICHUAN, CHINA (2015)



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TRIAL OBJECTIVE

To compare POLY4 to SOP as a low chloride alternative potassium source.

HIGHLIGHTS

IMPROVED SPRING AND SUMMER DRY WEIGHT YIELD BY 3% AND 7% RESPECTIVELY

MAINTAINED TEA QUALITY THROUGHOUT THE SEASONS WHILST ELEVATING YIELD

LOWER POST-TRIAL SOIL EC THAN SOP

IMPROVED RESIDUAL CALCIUM, MAGNESIUM AND SULPHUR IN THE SOIL BY 7%, 30% AND 4% COMPARED TO SOP

TRIAL DESIGN

PARTNER: SICHUAN ACADEMY OF AGRICULTURAL SCIENCE
LOCATION: SICHUAN, CHINA
YEAR: 2015
CROP VARIETY: WUNIUZAO

- Tea is the most popular drink in the world with 4.8 million tonnes consumed in 2013.¹
- China accounts for 72% of the global tea market, worth US\$12.87 billion in 2013.²
- Tea requires specific agro-ecological conditions including high temperatures and precipitation found in tropical climates.
- Potassium is a key yield driver, commonly supplied from SOP for this chloride-sensitive crop.
- The tea variety grown was Wuniuzao which is a local, high yielding variety.
- 50% of total nitrogen, 100% of total phosphate and 50% of total potassium were applied as base fertilizer at trial commencement, and the remaining 50% of total nitrogen and 50% of total potassium was applied as a dressing side in the spring.
- Pruning was conducted in spring and summer as tea bushes can be harvested several times in a year.

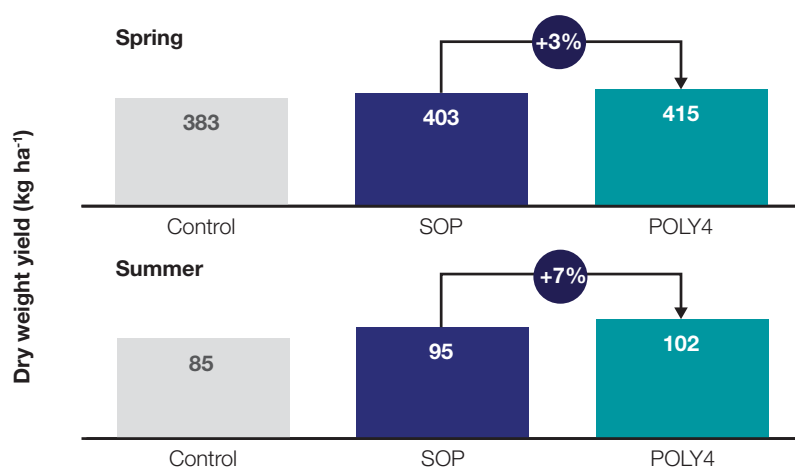
TREATMENT TABLE

FERTILIZER	AVERAGE NUTRIENT APPLICATION (kg ha ⁻¹) ^{3,4}						
	N	P ₂ O ₅	K ₂ O	MgO	CaO	S	Cl
Control	240	120	0	0	0	0	0
SOP	240	120	169	0	0	57	10
POLY4	240	120	169	72	205	229	36



YIELD RESULT $(\text{kg ha}^{-1})^{5,6}$

- POLY4 is an essentially chloride free source of potassium and represents an alternative fertilizer for tea farmers.
- Sustained potassium delivery during crop growth supports plant-water relations and disease tolerance.
- POLY4 increased leaf dry matter yields by 3% and 7% for spring and summer harvests respectively.



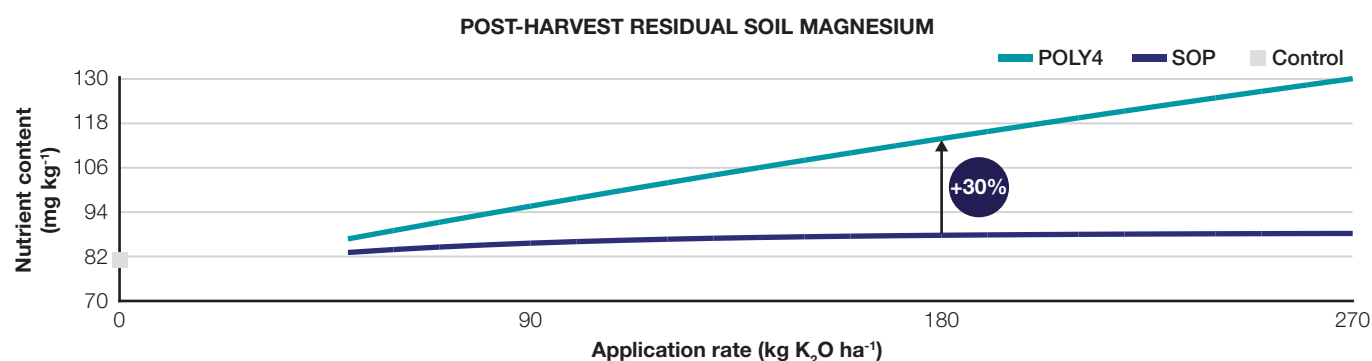
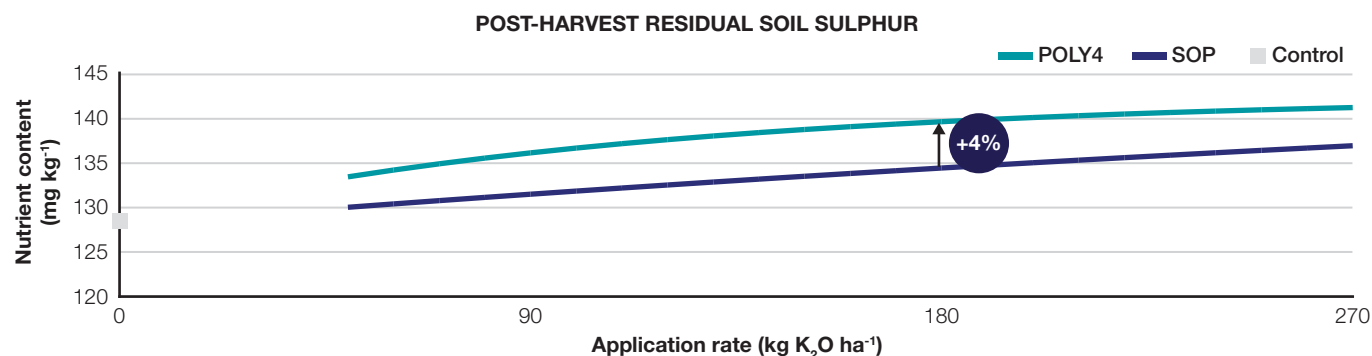
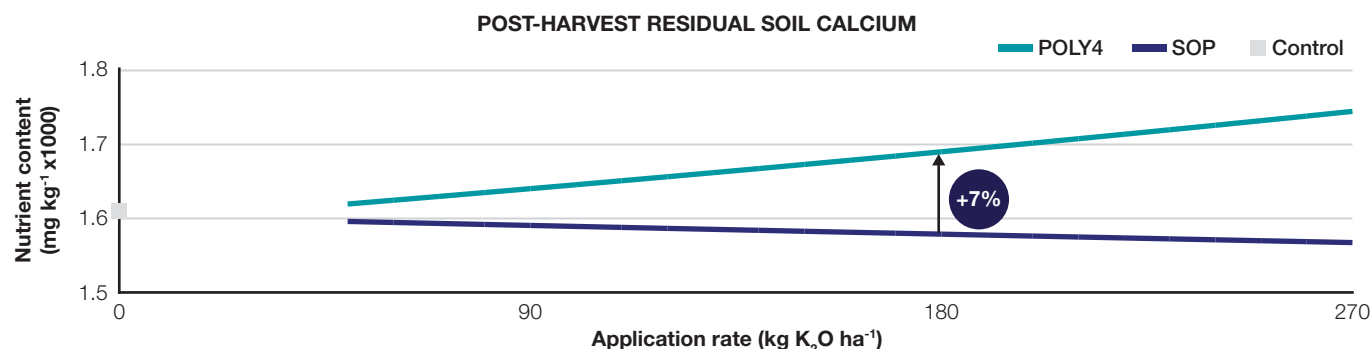
TEA QUALITY PARAMETERS $(\text{kg ha}^{-1})^{5,6}$

- Tea quality, as assessed by professional tasters, actually reflects the polyphenol/amino acid ratio.
- A lower ratio imparts a fresh and brisk taste, the higher the ratio of polyphenol the more acidic the flavour of the tea.
- Water extractable solids correlate with amino acids, theubins and flavour index.
- Leaf proteins release amino acids and caffeine during processing.
- All of these parameters support production of quality tea.

PARAMETER	CONTROL AND S-BASED FERTILIZER					
	Control		SOP		POLY4	
	Spring	Summer	Spring	Summer	Spring	Summer
Yield (kg ha ⁻¹)	383	85	403	95	415	102
Taste (polyphenol/amino acid ratio)	0.35	0.27	0.38	0.25	0.34	0.26
Protein (g kg ⁻¹)	389	426	393	429	396	433
Water extractable solids (g kg ⁻¹)	434	418	438	426	440	431

RESIDUAL SOIL NUTRIENTS ^{(mg kg⁻¹)^{4,7}}

- Residual nutrients reflect fertilizer application rates, with POLY4 supplying additional magnesium and calcium.
- Higher residual calcium, magnesium and sulphur in the soil can benefit future crops.
- POLY4 significantly improved soil calcium, magnesium and sulphur content post-harvest.



Notes: 1) FAO IGG Secretariat (2015); 2) FAO 2013; World tea production and trade: current and future development. FAO:Rome;
 3) GENSTAT means of inputs for 90–270 kg K₂O ha⁻¹ except for control where 0 kg K₂O ha⁻¹; 4) Urea and MAP supplied 240 kg N ha⁻¹ and 120 kg P₂O₅ ha⁻¹;
 5) GENSTAT means; 6) All plots received 240 kg N ha⁻¹ and 120 kg P₂O₅ ha⁻¹ from urea and MAP with 169 kg K₂O ha⁻¹ from SOP or POLY4;
 7) GENSTAT regression analysis. Initial soil analysis pH 4.56, p6.5 mg kg⁻¹, K 57 mg kg⁻¹; Ca 1602 mg kg⁻¹; Mg 88 mg kg⁻¹; S 126 mg kg⁻¹; EC 0.138 mS/cm.

Source: Sichuan Academy of Agricultural Science (2015). 19000-SAAS-19011-14

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