



POLY4
A SIRIUS MINERALS PRODUCT

TRIAL RESULTS

SOYBEAN

SÃO PAULO, BRAZIL (2016)

HIGHLIGHTS

**THE POLY4 BLEND
OUTPERFORMED THE
INDUSTRY STANDARD**

**ENHANCED MACRO AND
MICRO NUTRIENT OFFTAKE**

**YIELD INCREASED BY
7% COMPARED TO
MOP+SSP BLEND**

**GREATER YIELD ACHIEVED
HIGHER MARGIN BY US\$53/ha**

poly4.com

TRIAL OBJECTIVE

To evaluate POLY4 in a commercial fertilizer programme for soybean in Brazil.

In the World Agricultural Supply and Demand Estimates report (WASDE), the USDA indicate that the 2016/2017 soybean production is currently sitting at an estimated 348 million tonnes. The key drivers in the increasing soybean production are USA, Brazil and Argentina, who collectively contribute 81% to the global market. China, who is also among one of the largest soybean producers, has gained the status of the leading importer of soybeans.

COUNTRY	SHARE OF GLOBAL PRODUCTION
USA	33%
Brazil	31%
Argentina	17%

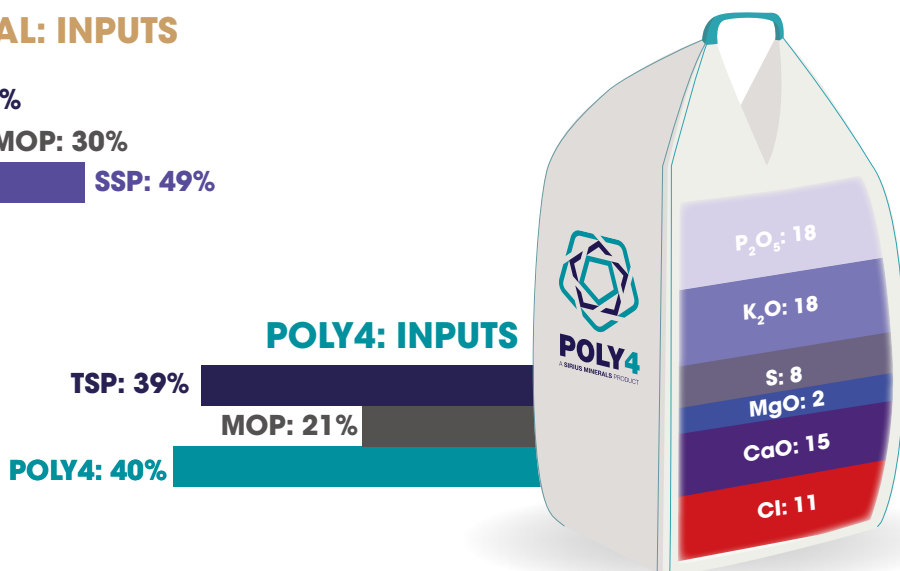
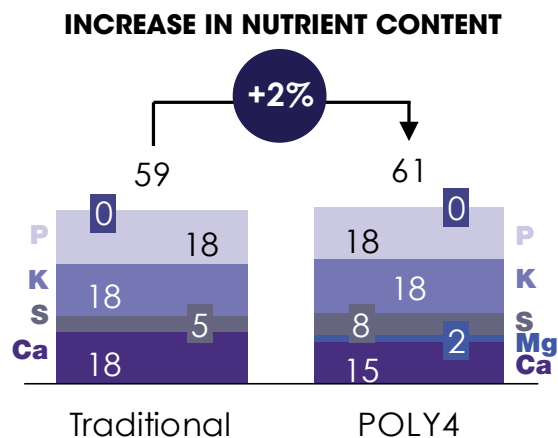
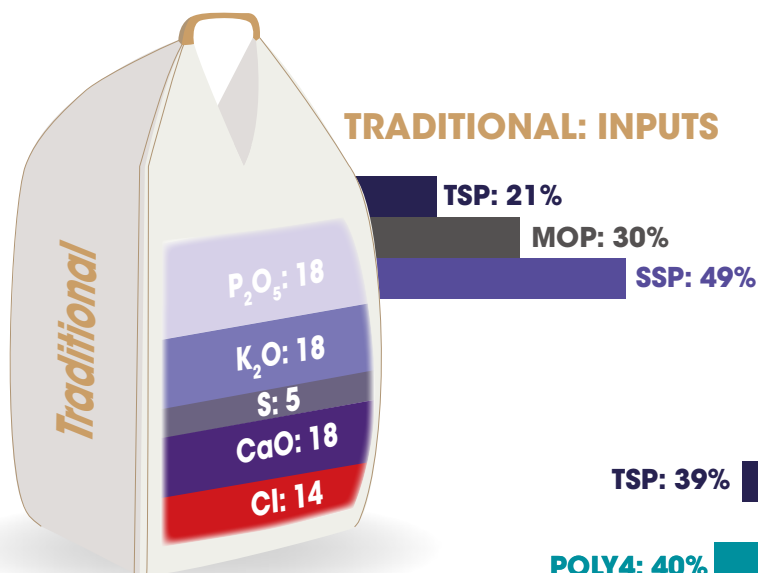
OVERVIEW

PARTNER: UNESP
LOCATION: SÃO PAULO, BRAZIL
YEAR: 2016

- Brazil produced 31% of the world's soybean in 2016/17 and is projected to become the world's largest soybean producer by 2026.^{1,2,3}
- Soybean production accounts for about 35% of K₂O fertilizer use in Brazil.⁴
- Treatments were a typical commercial blend with equivalent quantities of K compared to MOP+S from SSP.
- The trial was a randomized complete block design with seven replications.

BLEND COMPARISON

POLY4 increases nutrient density of blends, increasing S concentration by three points and adding Mg.



TREATMENT TABLE^{5.6}

TREATMENTS	AVERAGE NUTRIENTS APPLIED (kg ha ⁻¹)					
	P ₂ O ₅	K ₂ O	CaO	MgO	S	Cl ⁻
Control	72	0	71	0	23	0
Standard 0:18:18 blend	72	72	71	0	23	58
POLY4 0:18:18 blend	72	72	58	10	31	44



PLANT POPULATION^{5.6,7}

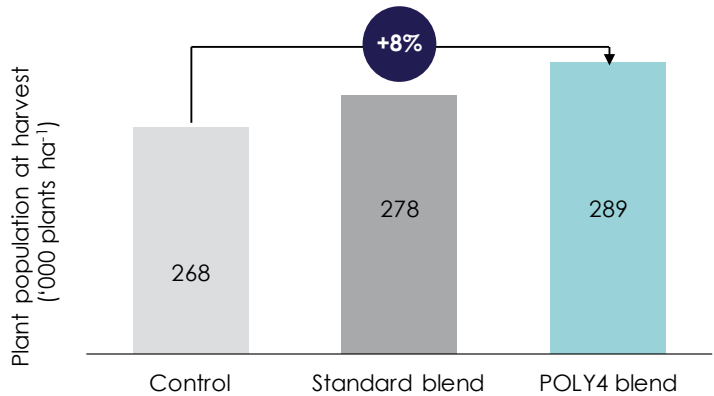
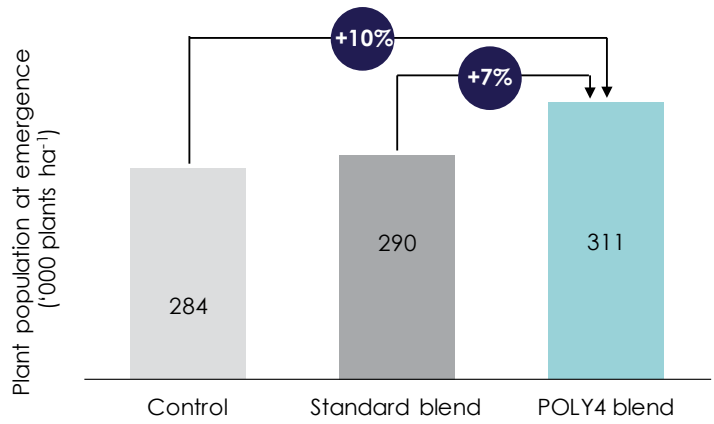
- Higher plant population density allows better light interception at early growth phase thus delivering greater growth and yield.
- POLY4 gave higher plant emergence, which subsequently continued to more plants at harvest.



GREATER PLANT EMERGENCE

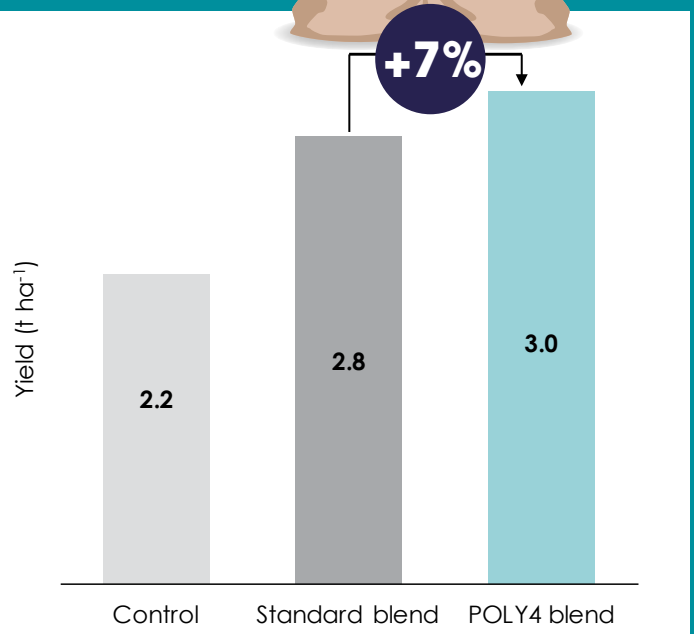
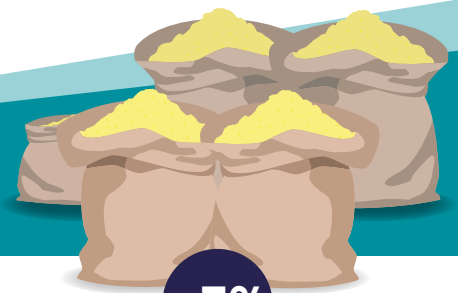


GREATER GROWTH AND YIELD



YIELD PERFORMANCE^{5.7}

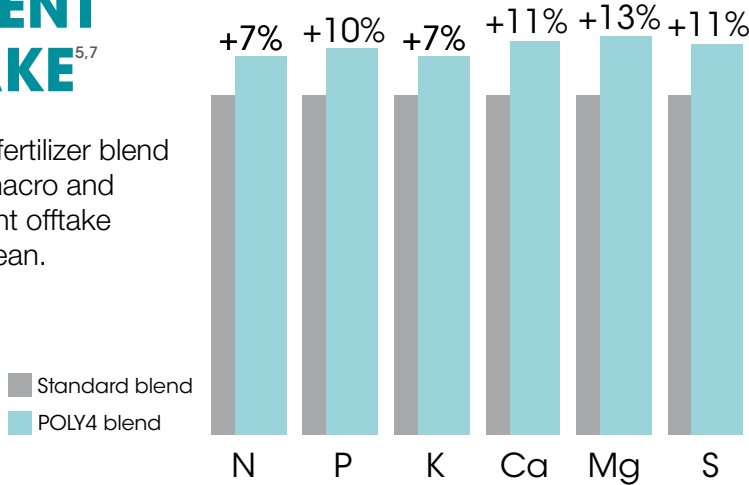
- There was a significant yield response to the fertilizer blends.
- The POLY4 blend had 7% greater yield than the industry standard PKS.
- In Brazil, based on average performance of 65 bags of soybean per hectare, 7% greater yield will deliver 4.5 bags more.



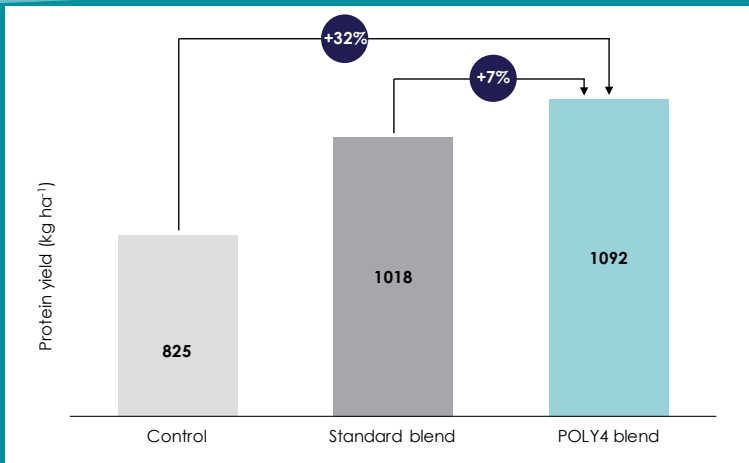
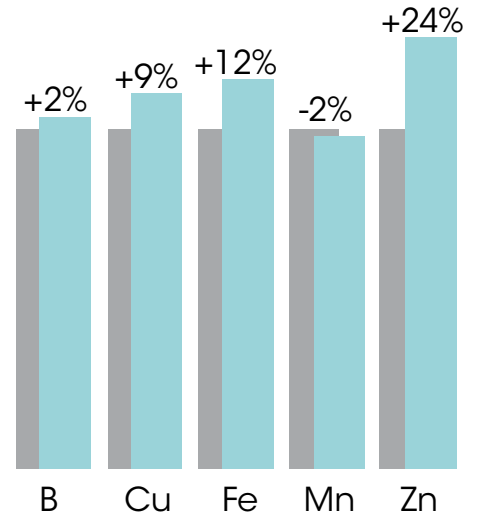
GRAIN NUTRIENT OFFTAKE^{5,7}

- The POLY4 fertilizer blend enhanced macro and micro nutrient offtake by the soybean.

Improvements in macro-nutrient offtake compared to the standard blend



Improvements in micro-nutrient offtake compared to the standard blend

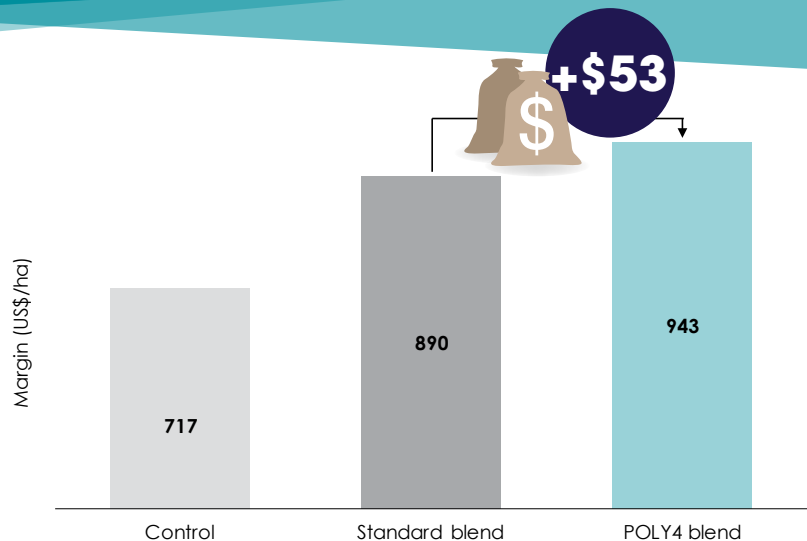


PROTEIN YIELD^{5,7,8}

- Soybean meal is used extensively as a protein source in animal feed.
- The POLY4 blend improved the protein yield by 7% compared to the standard industry blend.

MARGIN^{5,7,9,10,11}

- The POLY4 blend gave the greatest margin over fertilizer costs despite the inclusion of a more expensive P fertilizer.
- The greater margin of US\$53/ha was reached due to the greater yield achieved compared to the MOP+SSP blend.



Notes: 1) USDA Oilseeds World Markets and Trade (2017); 2) Agrinews (2014); 3) BrazilGovNews (2017); 4) International Plant Nutrition Institute, IPNI (2014); 5) Standard blend contained muriate of potash (MOP), single super phosphate (SSP) and triple super phosphate (TSP); POLY4 blend contained MOP, TSP and POLY4; 6) Initial soil analysis: pH 4.6; P 15 mg kg⁻¹, K 32 mg kg⁻¹, Ca 160 mg kg⁻¹, Mg 49 mg kg⁻¹, S 10 mg kg⁻¹, organic matter content 2.2%; 7) Results presented are based on data from GENSTAT ANOVA means at K₂O rate of 72 kg ha⁻¹; 8) Protein concentration: control (36.7%), standard blend (35.7%), POLY4 blend (35.9%) were converted from N content (%) by multiplying by 5.71; 9) Fertilizer prices were obtained from CRU and are 2017 prices for Brazil: MOP (US\$262/t), POLY4 (US\$200/t), TSP (US\$281/t), SSP (US\$144/t); 10) Costs include fertilizer spreading cost of US\$13.07/t; 11) Soybean price was obtained from FAOSTAT (US\$344/t); 12) Margin = crop output - (cost of fertilizer material + cost of fertilizer application).

Source: University of São Paulo (2016) 4000-USP-4022-16.

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