

TRIAL RESULTS

FUNDAÇÃO, BRAZIL (2014, 2015, 2016)



HIGHLIGHTS

A fertilizer plan that included POLY4 supported corn yield more than the MOP-only option.

The higher corn yield meant a US\$24/ha greater margin over the fertilizer cost than the MOP blend.

The increase in margin over the three-year trial showed that POLY4 blend consistently maintained the economic benefit.

The POLY4 blend increased the economic benefit by 16% compared to the MOP blend.

TRIAL OBJECTIVE

To evaluate POLY4 as a fertilizer for corn by comparing 6:14:14 blends made with MOP and MOP+POLY4 as K sources over a three-year trial.

USDA's World Agricultural Outlook report (Apr, 2018) states that USA, Brazil, Argentina and South Africa were major exporters of corn in 2016-17. USA and China remain the largest corn producers in the world with majority of their production remaining for domestic use.

Country	Corn production (Mmt)	Corn exports (Mmt)
USA	384.78	58.24
China	219.55	0.08
Brazil	98.50	31.60
Argentina	41.00	25.99
South Africa	17.55	2.20

OVERVIEW

PARTNER:FUNDAÇÃO MTLOCATION:MATO GROSSO, BRAZILYEAR:2014, 2015 and 2016

- In 2016-17 Brazil was one of the largest exporters of corn in the global corn market.¹ During the same crop season, Brazil produced 98.5 million tonnes of corn.²
- Trials took place in Mato Grosso, the largest corn producing state in Brazil.² This location is known for low soil K, S and Ca.
- The variety of crop trialled was corn Safrinha. Over the last eight years, this variety of corn has become the main production output in Brazil. In 2016-17 season, corn Safrinha represented more than two-thirds of 98.5 Million metric tonnes of total production.
- Corn was grown in rotation with soybean in a three-year trial on soils with low test K. Fertilizer applications were broadcast pre-planting.
- Trials plots were a complete randomised design with five replications.
- Results presented are averages of the three-year data.



TREATMENT TABLE^{3,4}

Treatment	Average nutrient applied in trial (kg ha-1)							
	Ν	$P_{2}O_{5}$	K_2O	MgO	CaO	S	CI	
CONTROL (N + P)	119	50	0	0	0	0	0	
6:14:14 (TSP+SSP+MOP)	119	50	50	0	59	22	40	
6:14:14 (MAP+MOP+POLY4)	119	50	50	11	31	35	25	



6:14:14 BLEND COMPOSITION[®]



CORN YIELD^{6,7}



- The POLY4 blend's nutrient spectrum and reduced chloride content supported corn yield increase.
- The results from the three-year trial showed that the inclusion of POLY4 in a fertilizer plan supported corn yield more than the MOP-only option.

FERTILIZER COST, OUTPUT AND MARGIN^{5,6,7,8,9,10}



- The POLY4 blend increased margin more than the MOP blend without significant increase in fertilizer cost. The higher corn yield achieved with the POLY4 blend meant greater margin over the fertilizer cost by US\$24/ha.
- The increase in margin over the three-year trial reflects the consistency of the POLY4 blend maintaining the economic benefit.

FINANCIAL RATIOS⁵⁻¹²

- Marginal benefit-cost ratio indicates the additional economic benefit derived in adding fertilizer, whereas margin-fertilizer cost ratio shows the economic benefit obtained for every dollar spent on fertilizer.
- The POLY4 blend increased the economic benefit by 16% compared to the MOP blend.
- A dollar spent on the POLY4 blend generated a greater output than that spent on MOP.



Note: 1) USDA (United States Department of Agriculture), 2017); 2) Meredith Agrimedia (2017); 3) The total N supply included 30 kg N ha⁻¹ from soybean and 68kg N ha⁻¹ from urea as top dressing; 4) Initial soil analysis based on average for 2014, 2015 and 2016 trials: pH 4.9; P 1 mg kg⁻¹, K 66 mg kg⁻¹, Ca 184 mg kg⁻¹, Mg 325 mg kg⁻¹, available S 4 mg kg⁻¹; 5) Nutrient composition: urea: 46:0:0; TSP: 0:45:0 + 15% CaO; SSP: SSP: 0:18:0 + 12% S + 28% CaO; MAP: 11:52:0; MOP: 0:0:60; POLY4: 0:0:14 + 19S + 6MgO + 17CaO; 6) Results presented are based on data from GENSTAT regression analysis at average K₂O rate of 50 kg ha⁻¹; 7) Yield results are average estimates from 2014, 2015 and 2016 trials; 8) Fertilizer prices were obtained from CRU and are based on average fertilizer prices: MOP (US\$302/t), POLY4 (US\$220/t), SSP (Brazil Inland: US\$229/t), TSP (US\$354/t), urea (US\$289/t) and MAP (US\$437/t). Analysis accounts for fertilizer application or spreading cost of US\$13.07/t; 9) Average corn price = US\$162/t; 10) Net return = crop output minus (cost of fertilizer material + cost of fertilizer application). The total cost calculation took into consideration the cost of additional 68 kg N ha⁻¹ from urea as top dressing. Nutrient composition: urea: 46:00; TSP: 0:45:0 + 20CaO; SSP: 0:18:0 + 11S + 28CaO; MAP: 11:52:0; MOP: 0:0:60; POLY4: 0:0:14 + 19S + 6MgO + 17CaO; 11) Margin-fertilizer ratio = margin (US\$/ha) divided by fertilizer cost (US\$/ha); 12) The marginal benefit-cost ratios were estimated using the benefit (yield) of the control as reference;

Sources: Fundação MT (2014, 2015, 2016) 5000-FMT-5010-14, 5000-FMT-5012-15 & 5000-FMT-5014-16

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