



POLY4
A SIRIUS MINERALS PRODUCT

TRIAL RESULTS **CORN**

NORTH DAKOTA, US (2014)



poly4.com

TRIAL OBJECTIVE

To evaluate corn response to low application rates of K_2O fertilizers with and without S.

HIGHLIGHTS

**DEMONSTRATION OF VALUE
IN SULPHUR FOR CORN**

DRIER AND 6% HEAVIER GRAINS

**3% IMPROVEMENT IN
STARCH CONTENT**

UP TO 18% HIGHER CORN YIELD

**HIGHER NUTRIENT INPUT
WITH LESS MATERIALS**

**HIGHER YIELD VALUES
IMPROVES FARMERS RETURNS**

TRIAL DESIGN

PARTNER: NORTH DAKOTA STATE
UNIVERSITY

LOCATION: US

YEAR: 2014

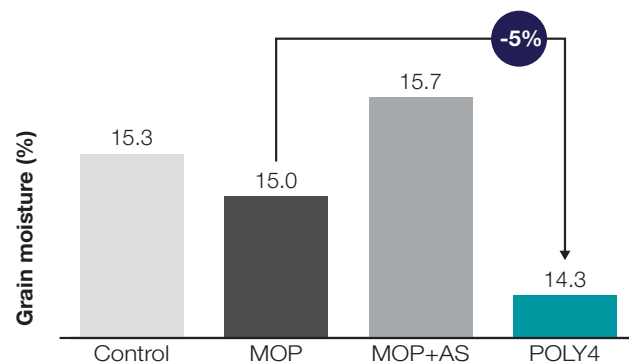
- The US accounts for 29% of the global corn market¹, equating to US\$265 billion annually in 2012.
- US consumes 89 kg K_2O ha⁻¹ corn equating to 22.3 million tonnes of POLY4.
- Soils in the US corn belt suffer from a range of nutrient deficiencies that vary between states.
- Field trial conducted in North Dakota, US on a loam soil with good drainage.
- The trial was planted with the round-up ready corn variety DKC-33-77.

TREATMENT TABLE

TREATMENTS	NUTRIENTS APPLIED (kg ha ⁻¹)				
	K ₂ O	CaO	MgO	S	Cl
Control	0	0	0	0	0
Control+AS	0	0	0	30	0
MOP	11	0	0	0	9
	22	0	0	0	18
MOP+AS	11	0	0	15	9
	22	0	0	30	18
POLY4	11	14	5	15	2
	22	28	10	30	4

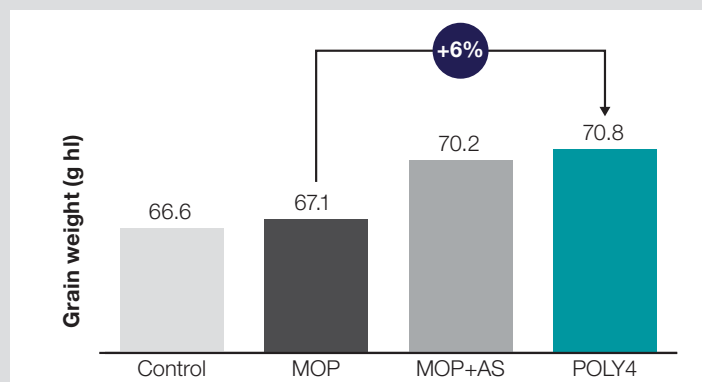
GRAIN MOISTURE (%)^{2,3}

- POLY4 achieves a significant grain moisture reduction over MOP and MOP+AS.
- Lower grain moisture supports early harvest and reduces post harvest drying cost.



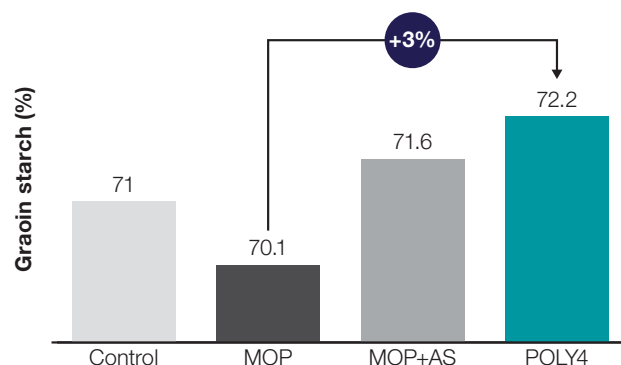
SPECIFIC GRAIN WEIGHT (g hl⁻¹)^{2,3}

- High specific grain weight coupled with low grain moisture ensures crop value through financial returns to the farmer.
- POLY4 achieves a 5% higher specific grain weight over MOP.



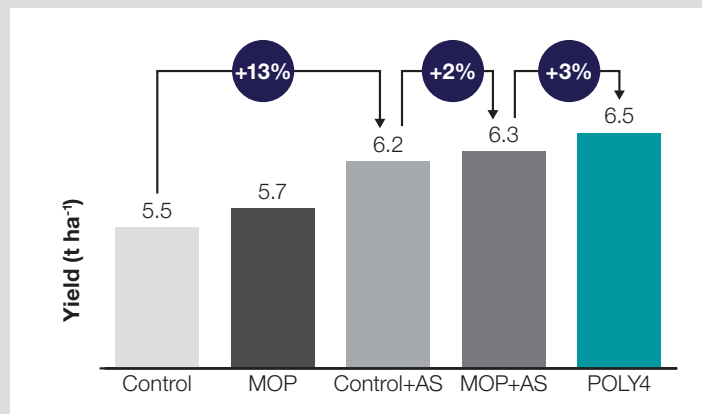
STARCH CONTENT (%)^{2,3}

- Energy from photosynthesis is used to make sugars, which are converted to and stored as starch, providing an energy store for the young plant.
- POLY4 improves the starch content of corn by 3% over MOP.
- Starch is an important component in food, pharmaceutical, animal feed and manufacturing industries⁴.



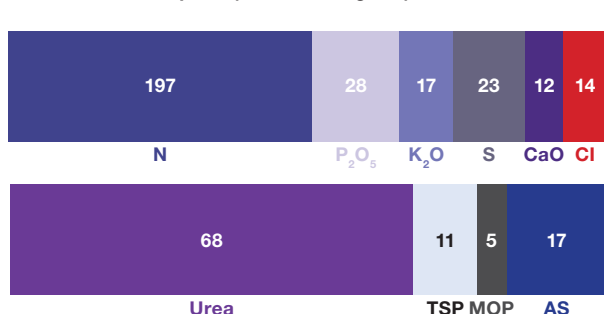
CORN YIELD (t ha⁻¹)^{2,3}

- Sulphur deficiencies on US farms increase demand for a sulphur fertilizer source.
- Sulphur has a positive effect on corn plants and grain characteristics at low K₂O levels.
- MOP alone limits corn yields to 5.7 t ha⁻¹ in this trial.
- On soil with adequate K supply, adding sulphur increases yield by 13%.
- Despite adequate soil Mg and Ca, POLY4 delivers nutrients as required which enhances yield by 3% beyond a K and S nutrient supply or 18% over control.

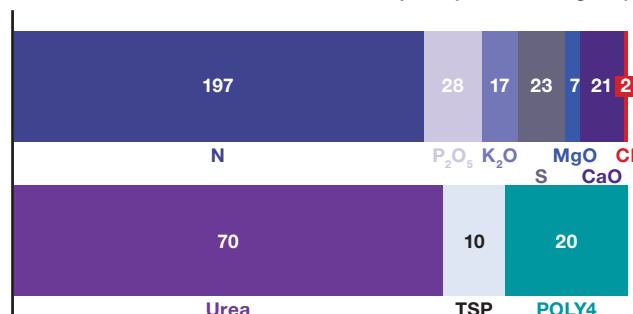


FERTILIZER PLAN AND ECONOMIC ASSESSMENT⁵⁻⁷

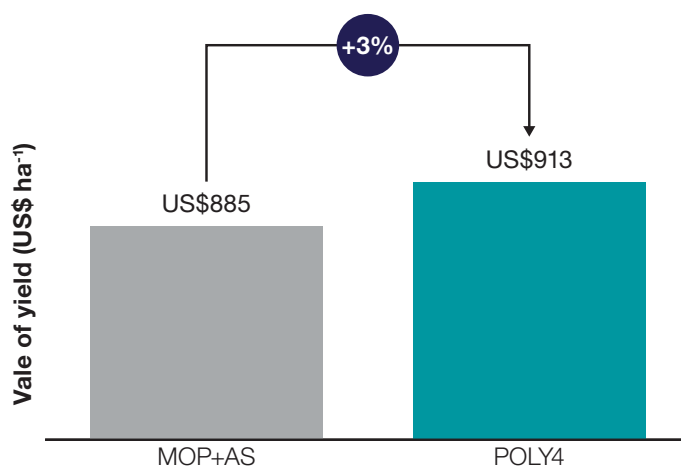
MOP+AS NPK+S option (as nutrient kg ha⁻¹)



POLY4 NPK+S option (as nutrient kg ha⁻¹)



- POLY4 improves the fertilizer plan through nutrient balance with improved yields.
- Farmers using POLY4 would gain US\$25 ha⁻¹ from improved yields⁶.
- For an average farm in North Dakota of 507 ha⁻¹ that translates into US\$12,675 ha⁻¹ extra income.
- POLY4 option requires three material inputs compared to four from MOP option⁷.



Notes: 1) FAO 2017; 2) GENSTAT mean yields for 0–22 kg K₂O ha⁻¹; 3) All treatments received 197 kg N ha⁻¹ and 28 kg P₂O₅ ha⁻¹; 4) Corn Refiners Association 2015; 5) Fertilizer prices based on quoted CRU U.S. prices Q2-2015; Urea (US\$422/t), TSP (US\$473/t), AS (US\$302/t), MOP (US\$384/t), POLY4 price (US\$200/t); 6) Prices based on USDA commodity prices 2014 of US\$3.51 bushels for corn adjusted for yields of 6.3 t ha⁻¹ using traditional plan and 6.5 t ha⁻¹ using POLY4 plan including input costs; 7) Weight of material inputs for MOP option is 567 kg compared to 609 kg for POLY4 option. Initial soil analysis: pH 7; Organic Matter 2.8%; P 3 mg kg⁻¹; K 140 mg kg⁻¹; S 5 mg kg⁻¹; Ca 2352 mg kg⁻¹; Mg 464 mg kg⁻¹; Zn 0.32 mg kg⁻¹; CEC 16 meq/100g.

Source: North Dakota State University (2014), Sirius Minerals, CRU, USDA 15000-NDS-15010-14

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