

TRIAL RESULTS

POTATO

MEERUT (UTTAR PRADESH), INDIA (2018)

HIGHLIGHTS

POLY4 improved early growth parameters: plant height, crop canopy and leaf greenness compared to MOP + S.

POLY4 increased marketable yields by 14%.

Potato dry matter content was 7% greater with POLY4.

Financial margins were increased by US\$130/ha when POLY4 replaced MOP + S.

TRIAL OBJECTIVE

To assess the response of potato yield and quality to POLY4 fertilizer in India.

The trial was in Uttar Pradesh, which produces more potatoes than any other state in India.¹

Province	Production (Mmt)
Uttar Pradesh	13.9
West Bengal	8.4
Bihar	6.4
Gujarat	3.6
Madhya Pradesh	3.2

OVERVIEW

PARTNER: Sardar Vallabhbhai Patel University of Agriculture and Technology.

LOCATION: Meerut, Uttar Pradesh, India.

YEAR: 2018

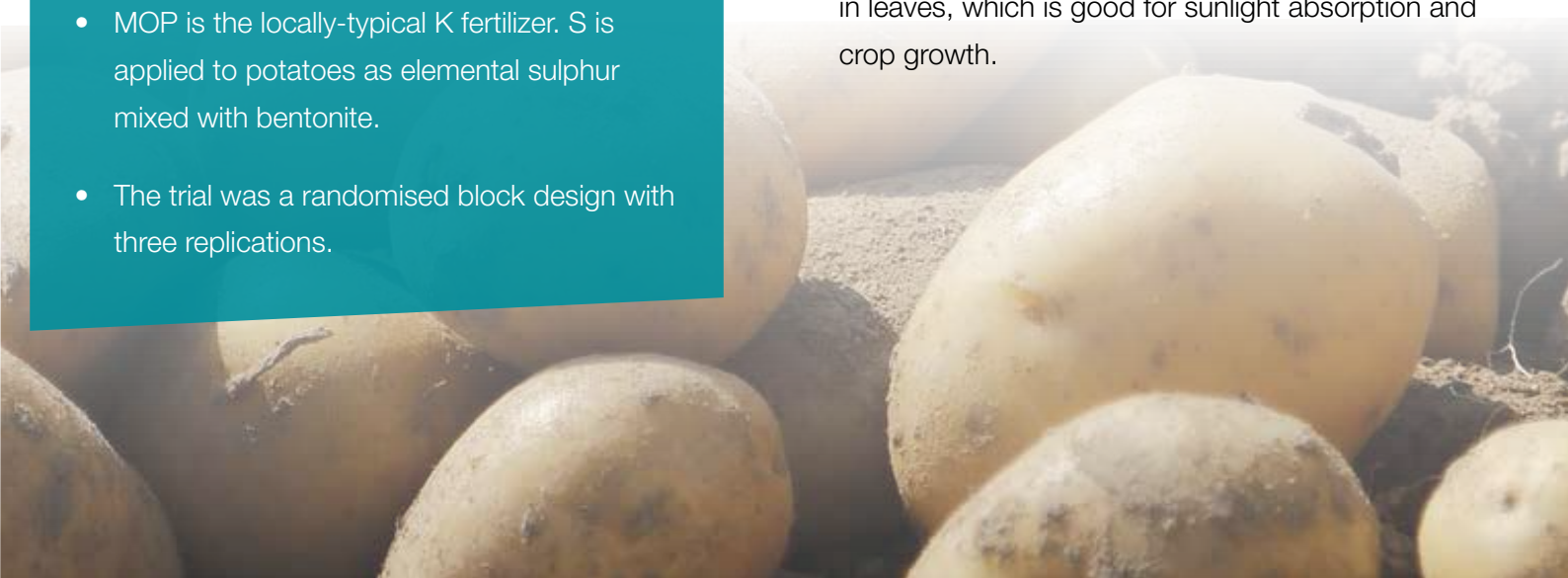
- 2.2 million hectares of potatoes were planted in India in 2017-2018.¹ Total annual production is 49 Million metric tonnes (Mmt).
- The potato variety used was Kufri Chipsona-1, a popular variety suitable for frying.
- The growth and yield of potatoes was measured after application of POLY4 and MOP at 75, 150 and 225 kg K₂O ha⁻¹.
- MOP is the locally-typical K fertilizer. S is applied to potatoes as elemental sulphur mixed with bentonite.
- The trial was a randomised block design with three replications.

TREATMENT TABLE^{2,3,4}

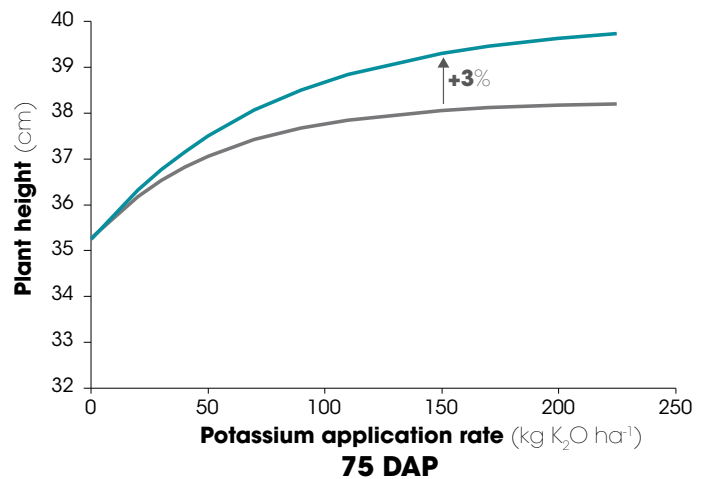
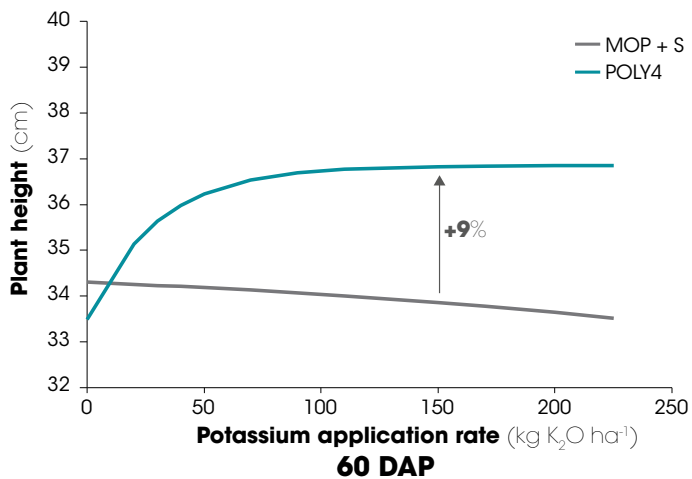
Treatments	Nutrients applied (kg ha ⁻¹)						
	N	P ₂ O ₅	K ₂ O	CaO	MgO	S	Cl ⁻
N + P (control)	270	80	0	0	0	0	0
POLY4 75	270	80	75	91	32	102	16
POLY4 150	270	80	150	182	64	204	32
POLY4 225	270	80	225	273	96	305	48
MOP75 + S	270	80	75	0	0	102	54
MOP150 + S	270	80	150	0	0	204	108
MOP225 + S	270	80	225	0	0	305	161
MOP + POLY4 (25:75)	270	80	150	137	48	153	33
MOP + POLY4 (50:50)	270	80	150	91	32	102	58
MOP + POLY4 (75:25)	270	80	150	46	16	51	83

EARLY CROP GROWTH⁴

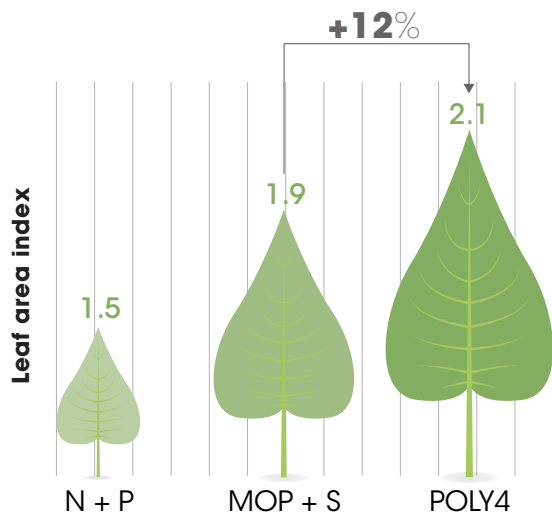
- Increased plant height and leaf area index (LAI) allow plants to capture more light for photosynthesis and shade out weeds that otherwise compete for light, nutrients and water.
- POLY4 fertilized potato plants were taller and had 12% more LAI than the MOP + S treatments (average of K fertilizer rates). Improvement in LAI also reflected better nutrient use efficiency.
- Soil-plant analysis development (SPAD) quantifies the greenness of leaves and therefore their photosynthetic capacity.
- POLY4 fertilized potato plants had significantly⁴ greener leaves (+6% SPAD) than the MOP + S treatments (average of all K fertilizer rates). Higher SPAD reflects an improvement in chlorophyll content in leaves, which is good for sunlight absorption and crop growth.



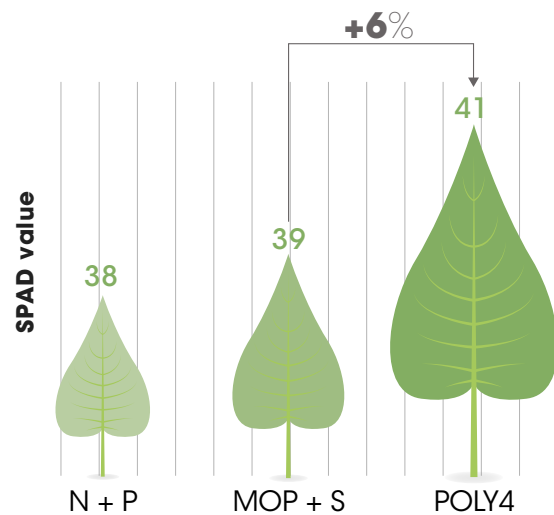
HEIGHT VERSUS DAYS AFTER PLANTING (DAP)



LEAF AREA INDEX⁵



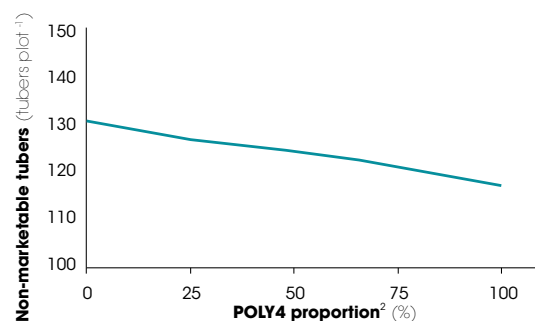
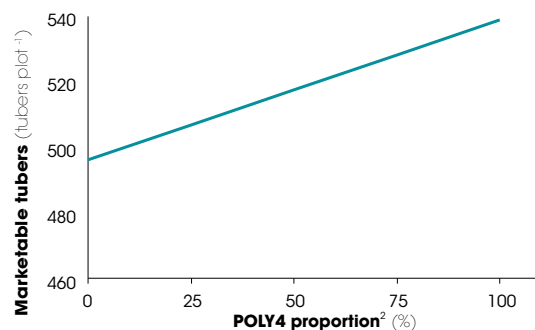
SPAD VALUE⁵



POTATO YIELD

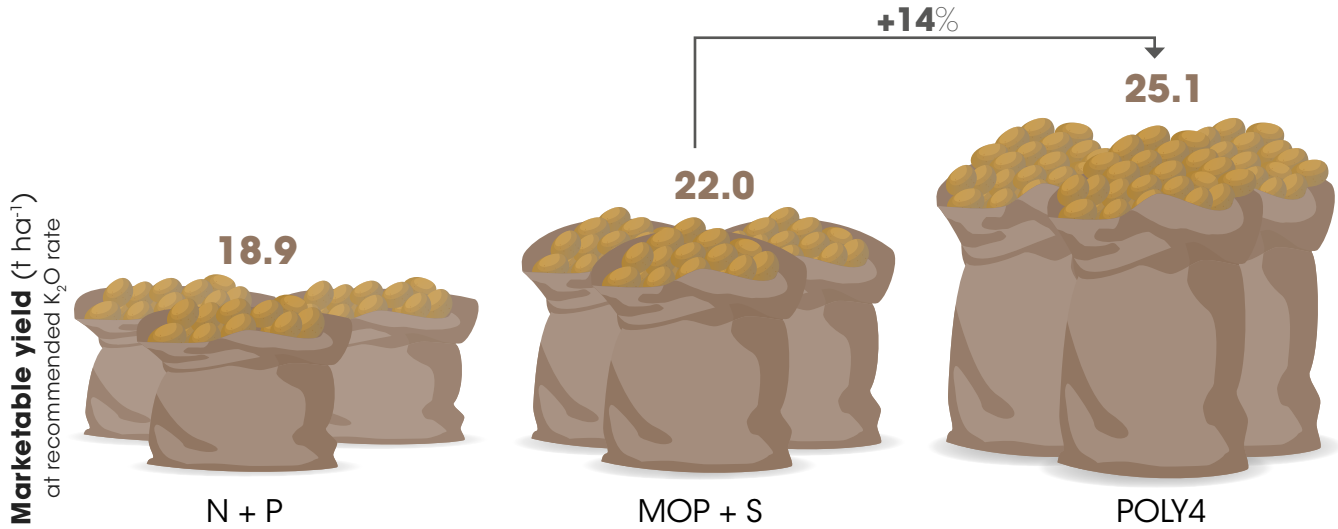
- The total number of tubers was significantly⁴ increased when a greater proportion of fertilizer K was supplied by POLY4.
- Tubers that weighed less than 25 g were considered non-marketable.
- POLY4 inclusion tended to reduce the number of non-marketable tubers.

TUBER NUMBERS



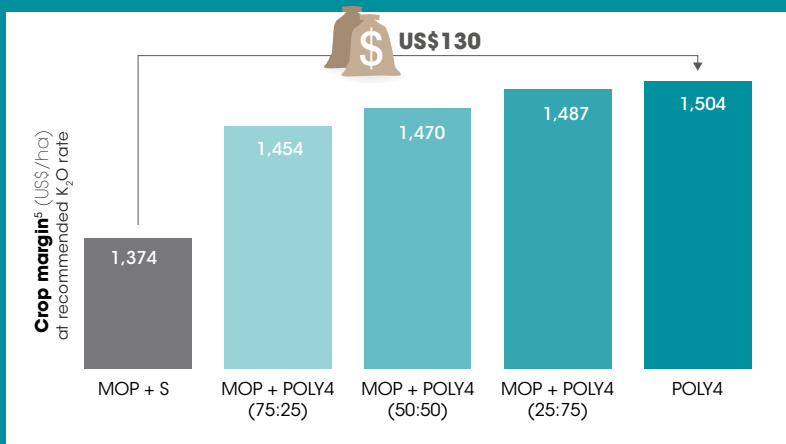
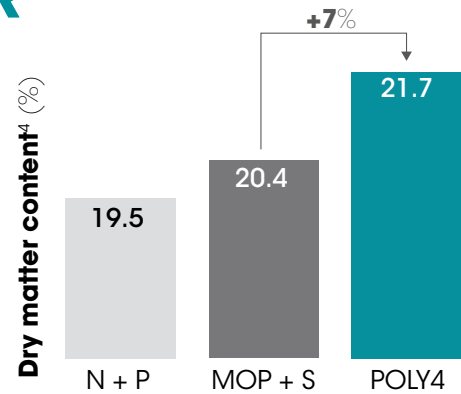
POTATO YIELD continued...

- Processing potatoes are generally more responsive to potassium. POLY4, as a K source, delivered better total tuber yield than MOP.
- At the recommended application rate (150 kg K₂O ha⁻¹), POLY4 increased marketable yield by 14% compared to MOP + S.



POTATO QUALITY: DRY MATTER

- Potatoes with higher dry matter (DM%) content are more suitable for frying and attract a price premium. On average POLY4 significantly⁴ increased tuber DM% by 7% compared to MOP + S.
- DM% was significantly⁴ increased when a greater proportion of the fertilizer K was supplied by POLY4.



FINANCIAL ANALYSIS^{4,6}

- The POLY4 treatment gave the best additional return by US\$130/ha compared to MOP + S.

Note: 1) Statistics of Horticulture, Ministry of Agriculture & Farmers Welfare, India (2017); 2) Treatment table is based on the recommended K₂O rate of 150 kg K₂O ha⁻¹. MOP + S contains elemental sulphur with bentonite. All treatments received 270 kg N ha⁻¹ and 80 kg P ha⁻¹; 3) POLY4 = 3% Cl⁻, and MOP = 48% Cl⁻; Initial soil analysis: pH 8.1; EC 0.33 dS m⁻¹; 139 kg N ha⁻¹; 9.5 kg P ha⁻¹; 112 kg K ha⁻¹; and 9 kg S ha⁻¹. pH and EC measured in a 1:2.5 soil:water extraction; 4) Results presented are based on data from GENSTAT factorial plus added control and regression analyses, with significance tested at 5% level; 5) Measured 60 days after planting; 6) Fertilizer prices based on local prices: MOP (US\$194/t), POLY4 (US\$181/t), bentonite (US\$270/t). Analysis accounts for fertilizer application of spreading cost of US\$9.10/t. Potato price was US\$75/t. Margin = crop output (US\$/ha) minus (cost of fertilizer material plus spreading cost).

Source: Sardar Vallabhbhai Patel University (2018) 76000-SVPU-76010-17

siriusminerals.com | +44 1723 470 010 | commercial@siriusminerals.com

Registered Address: 3rd Floor Greener House, 66-68 Haymarket, London SW1Y 4RF, UK

Company Registered Number: 4948435

