



Technical Bulletin:

Reducing MOP with Polysulphate

POLYSULPHATE[®]

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Cutting Chloride, Boosting Yield: Getting more out of your MOP with Polysulphate® in row crop systems.

The progress of agriculture is rooted in the principle of producing more with less. Muriate of Potash (MOP or KCl) has long been the standard potassium (K) source in many production systems. Yet despite the availability of alternatives like potassium sulphate (SOP), MOP has remained the dominant (K) source due to cost and availability, while SOP has generally remained a secondary option. **Polysulphate supplies K, in the sulfate form, with additional valuable secondary nutrients.**

In 2024, ICL conducted a series of field experiments across the Southern U.S. in **corn, rice, and sugarcane** to evaluate alternative potassium strategies. The goal was to meet the crop's sulfur requirements by applying Polysulphate while also diversifying the potassium source. This was achieved by blending Polysulphate, applied at 200 lbs./A, with MOP, reducing the MOP rate by 50-70%.

At 200 lbs/A, Polysulphate supplies approximately **28 lbs of K₂O, 38 lbs of sulfur (S), 24 lbs of calcium (Ca), and 7.2 lbs of magnesium (Mg)**. In comparison, 200 lbs/A of MOP supplies **120 lbs of K₂O and 94 lbs of chloride (Cl⁻)**. By reducing the MOP rate by 50%, chloride input is also cut in half—from **94 lbs/A** down to **47 lbs/A**—while Polysulphate offsets the potassium reduction and adds valuable secondary nutrients.

3 things to know about blending Polysulphate with MOP



- 1. Yield stability or improvement across crops:** Across corn, rice, and sugarcane, reducing MOP and supplementing with Polysulphate maintained or increased yield compared to grower standard practices.
- 2. Enhanced Nutrient Efficiency:** Polysulphate supplies secondary nutrients (S, Ca, Mg) and matches or increases yield with lower total potassium applied.
- 3. Reduced Chloride Input:** Replacing 50% MOP with Polysulphate reduces chloride by half, which can improve crop health, particularly in chloride sensitive crops and soils.

Key Learnings

Blending Polysulphate with reduced MOP maintains or improves crop yield across multiple cropping systems. It enhances nutrient efficiency and reduces chloride load, making it a more efficient and sustainable potassium source, while also supplying essential nutrients like calcium (Ca), magnesium (Mg), and sulfur (S). Soil test levels for potassium and sulfur, as well as crop variety, should guide the appropriate application rate.

CORN TRIAL
CEDAR HILL, TN



Objective: Evaluate the impact of reducing MOP by 50% and replacing it with Polysulphate on corn yield and test weight.

- Fertilizers used:**
- Foliar: Nova FLOW® (5-10-20-11S-9Mg-0.5B) and PULSE® (0-6-4-1.3S-1Mg-0.5Co-10Mo-6Zn)

- Key Results:**
- Addition of Polysulphate while reducing MOP improved both test weight and yield.
 - Polysulphate without MOP and adding foliar Nova FLOW and Nova PULSE increased corn yield by 6% (10 bu/A) over GSP.

Treatment Description	Rate of K ₂ O (lbs./A)	Test weight (lbs./bu)	Yield (bu/A)
Grower Standard Practice (GSP) (0-0-60 MOP, 133 lbs./A)	80	59	163
Reduced MOP + Polysulphate (0-0-14, 67 lbs./A + 200 lbs./A)	68	59.3	165
Polysulphate (0-0-14, 200 lbs./A)	28	59.58	169
Polysulphate (0-0-14, 200 lbs./A) + FLOW (3 lbs./A) + PULSE (0.5 lbs./A)	28	59.65	173

Table 1. 2024 Corn trial Cedar Hill, TN
Soil test K: 115 ppm (230 lb./A)

RICE TRIAL
MEMPHIS, TN
& CAMPBELL, MO



Objective: Evaluate rice response to reduced MOP and added Polysulphate across two locations.

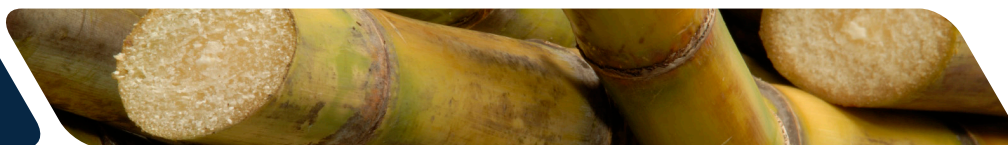
- Key Results:**
- Across both locations yield increased with reduced MOP and added Polysulphate by 7 to 11 bu/A over the GSP.
 - TN: (10 ppm soil S and 186 ppm soil K):** Yield increased with reduced MOP and added Polysulphate.
 - MO: (20 ppm soil S and 218 ppm soil K):** Similar yield to GSP with Polysulphate addition.

Treatment Description	Rate of K ₂ O (lbs./A)	TN Yield (bu/A)	MO Yield (bu/A)	Avg Yield (bu/A)
GSP (0-0-60 MOP, 150 lbs./A)	90	117	179	148
Polysulphate (0-0-14, 200 lbs./A)	28	133	176	155
Reduced MOP (75 lbs./A) Polysulphate (200 lbs./A)	75	143	175	159

Table 3. 2024 Rice trial, Memphis, TN and Campbell, MO.
Soil test K: TN 186 ppm (372 lbs./A); MO 218 ppm (436 lbs./A)

- Differences may be due to initial soil S and K levels (rice is sensitive to high S levels) and variety differences:
 - TN:** Variety PVL03
 - MO:** Variety CL118
- To optimize both potassium and sulfur application, we are evaluating lower rates of Polysulphate in rice systems. Growers in Southeast Missouri applying 100-150 lbs/A of Polysulphate have reported yield increases comparable to those observed in our Tennessee trial site of 10 to 20 bu/A. Based on these results, we have updated our recommendation for rice to a Polysulphate application rate of 100-150 lbs/A. These rates will be further evaluated in our new trials plan.

SUGARCANE TRIAL HOUMA, LA



Objective: Evaluate the impact of reducing MOP of the grower standard and replacing it with Polysulphate on sugarcane yield.

Key Results:

- Highest sugar and yield was achieved with reduced MOP at 50% (100 lbs./A) and 70% (140 lbs./A) in combination with 200 lbs./A of Polysulphate.
- Polysulphate proves to be beneficial both as a standalone and in combination with MOP.
- Polysulphate at 200 lbs/A (28 lbs./A K₂O) alone produced similar yield to MOP applied at 200 lbs/A (120 lbs./A K₂O).
- Polysulphate was shown to be a more efficient K source compared to MOP.

Treatment Description	Rate of K ₂ O (lbs./A)	Cane Yield (Ton/A)	Sugar Yield (lbs./A)	Total Recoverable Sugar (TRS) (lbs./T)
Control (unfertilized)	0	40	9954	249
GSP (0-0-60 MOP, 200 lbs./A)	120	42	10804	257
Polysulphate (0-0-14, 200 lbs./A)	28	43	10982	255
Reduced MOP (100 lbs./A) Polysulphate (200 lbs./A)	88	43	11069	256
Reduced MOP (140 lbs./A) Polysulphate (200 lbs./A)	112	45	11365	250
Reduced MOP (200 lbs./A) Polysulphate (200 lbs./A)	148	42	10317	245

Table 4. 2024 Sugarcane trial at Spanish Trail, Houma, LA (Variety L 01-299)
Soil test: pH 6.4, K 102 ppm (204 lbs./A)



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