

Preliminary evaluation of a novel elemental sulphur fertilizer

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Background

- Oxidation of S° a function of particle size and soil contact
- Karamanos and Janzen found that a “finely-divided suspension” of S° sprayed-applied to soil oxidized in year of application (Can. J. Soil Sci. 71:213-225)
- Problem of sulphur melting, dust and explosions

Background

- Mean particle size < 20 microns, spherical
- Spray-applied
- Carbon footprint from manufacturing about 5% of ammonium sulphate on equal S basis

Purpose and Methodology

- Compare soil sulphate levels during the growing season, canola S uptake, and canola yield from sprayed Sulgro, sprayed ammonium sulphate, and side-banded ammonium sulphate (dual N-S)
- S applied at 0, 20, 40 kg S ha⁻¹
- Sprayed treatments 80 L/ac per application



Spring soil analysis at Glenwood and Radway with NPKS in ppm

Site	Depth	N	P	K	S	pH	EC
Glenwood	0-15	11	17	389	7	7.9	.2
	15-30	8			6		.2
	30-60	5			21		.2
Radway	0-15	9	15	142	5	6.4	.3
	15-30	5			5		.3
	30-60	4			6		.4





2018 growing season rainfall and heat accumulation compared to normal at Radway and Glenwood Alberta

	Glenwood				Radway			
	Rainfall (mm)		GDD (base 5)		Rainfall (mm)		GDD (base 5)	
Month	Actual	Normal	Actual	Normal	Actual	Normal	Actual	Normal
May	44	83	262	138	16	44	279	178
June	67	102	263	243	104	79	305	282
July	57	48	364	354	65	87	362	356
August	61	53	381	339	47	59	308	323
Sept 1-15	11	31	102	111	29	24	60	98
Total	240	317	1372	1185	261	293	1314	1237

Based on Alberta Climate Information Service weather stations nearest the research sites ("Radway" and "Cross Drain 5")

Glenwood grain yield, biomass yield and S uptake in 2018

	Yield (kg/ha)	Biomass Yield (kg/ha)	S Uptake (kg S/ha)
AS Banded	1036	5279	44
AS Sprayed	1023	5611	45
Sulgro Sprayed	999	5504	45
0	1047	5239	43
20	1047	5468	45
40	965	5686	47

Radway grain yield, biomass yield and S uptake in 2018

	Yield (kg/ha)	Biomass Yield (kg/ha)	S Uptake (kg S/ha)
AS Banded	4400	8754	59
AS Sprayed	4226	8358	53
Sulgro Sprayed	4285	8306	51
0	4191	8445	51
20	4321	8192	53
40	4399	8781	59

PRS® S supply rate (mg S/m²/burial period)

		Glenwood			Radway		
Product	S Rate	Burial 1	Burial 2	Burial 3	Burial 1	Burial 2	Burial 3
None	0	79d	69d	728	80b	86c	227b
AS	20	357b	265b	852	178a	169b	285ab
	40	459a	381a	847	168a	221a	310a
Sulgro	20	124c	126c	845	133ab	166b	323a
	40	146c	218b	829	123ab	163b	322a
P(trt)		<0.001	<0.001	<0.41	<0.03	<0.001	<0.05

Relative effectiveness of Sulgro (% of ammonium sulphate)

	Glenwood		Radway	
S Rate	Burial 1	Burial 2	Burial 1	Burial 2
20	16	29	54	96
40	18	48	48	57

Summary

- S uptake on PRS probes indicates that Sulgro is oxidizing within weeks of application
- Hope to expand to six sites in Alberta in 2019, near Lethbridge and Edmonton
- Two sites with fall sprayed Sulgro
- Research likely to expand to national level