

Micro-Essentials® SZ (MESZ) As a Starter Fertilizer for Corn in North-Western Ontario

Purpose:

MESZ ® is a granulated fertilizer that incorporates phosphorus, sulphur and zinc within each granule, which should overcome issues with uneven distribution of micronutrients in the starter band. This trial was intended to test whether this improved distribution of nutrients translated into higher yields or quality of silage corn.

Methods:

Field trials were established at Riverbend Farms, just outside of Thunder Bay over 2007-2009 within fields of silage corn. Treatments included a check with no starter fertilizer other than urea, MESZ treatment, and a blended starter to provide the same nutrients as the MESZ. Nutrients contained in the MESZ are listed in Table 1.

Table 1: MicroEssentials® SZ Typical Analysis:

Nutrient	Percent of Total
Total Nitrogen	12%
Available P ₂ O ₅	40%
Total Sulphur	10%
Sulphur as Sulphate	5%
Sulphur as elemental S	5%
Total Zinc	1%

Treatments were replicated 4 times, using a distributed lay-out as shown here:

Rep 1			Rep 2			Rep 3			Rep 4		
Check	MESZ	Blend	Blend	MESZ	Check	Check	MESZ	Blend	Blend	MESZ	Check

This lay-out is not completely random, so the variances calculated from the results may not be as precise as from a randomized trial, but it does provide significant efficiency during planting, and ensures that the plots are distributed to as to minimize the influence of field bias.

Table 2: Actual Nutrients Applied in 2007

Treatment	Actual N	Available P ₂ O ₅	Actual Sulphur	Actual Zinc
Blend (MAP + Zn)	50.8 lb/ac	44.5 lb/ac	0.36 lb/ac	1.8 lb/ac
MESZ	52.2 lb/ac	36.0 lb/ac	9.0 lb/ac	0.9 lb/ac
Check	None	None	None	None
Soil Test Recommendation	42 lb/ac	45 lb/ac	0	0

Note: starter blends also included urea to provide the nitrogen. All fertilizer applied in 2x2 band at planting.

The “Blend” treatment was modified following the 2007 season to provide the same level of sulphur as the MESZ treatment. Ammonium sulphate was added to the blend treatment, while urea was added to the MESZ to provide equivalent amounts of N. This was done to insure that any differences in yield were due to the formulation of the fertilizer, and not to the nutrients applied.

Table 3: Actual Nutrients applied in 2008 and 2009

Treatment	Actual N	Available P ₂ O ₅	Actual Sulphur	Actual Zinc
Blend	28 lb/ac	19 lb/ac	4.7 lb/ac	0.47 lb/ac
MESZ	29 lb/ac	20 lb/ac	4.9 lb/ac	0.50 lb/ac
Check	0	0	0	0
soil test recommendation	110 lb/ac	77 lb/ac		0

Note: The fields also received manure to provide the balance of the required N and P. No potassium was required.

Results:

2007:

Both the “check” and “blend” treatments showed significant stunting and leaf striping during the 2007 growing season. Tissue samples collected both at the 5 leaf stage and at tasselling showed adequate levels of N, P and Zn, but low levels of sulphur (Tables 4 and 5).

Table 4: Plant Tissue Results From Whole Plants Collected June 29, 2007

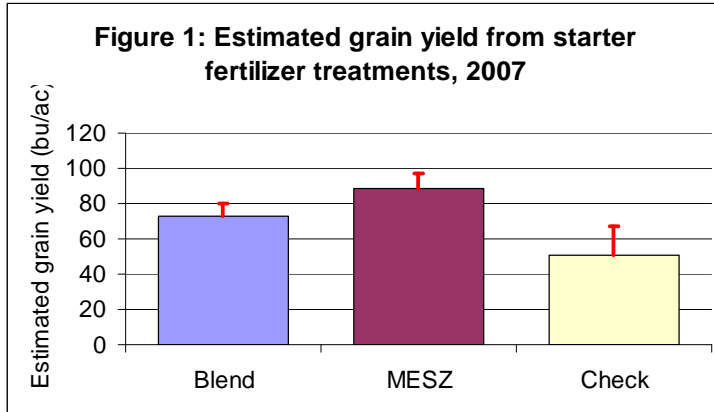
Treatment	N (%)	P (%)	S (%)	Zn (ppm)
Blend	5.07	0.50	0.10	58
MESZ	4.85	0.45	0.18	55
Check	3.67	0.44	0.14	48

Table 5: Plant Tissue Results From ear Leaves Collected August 1, 2007

Treatment	N (%)	P (%)	S (%)	Zn (ppm)
Blend	2.56	0.34	0.05	57
MESZ	2.46	0.26	0.09	46
Check	2.43	0.29	0.12	41

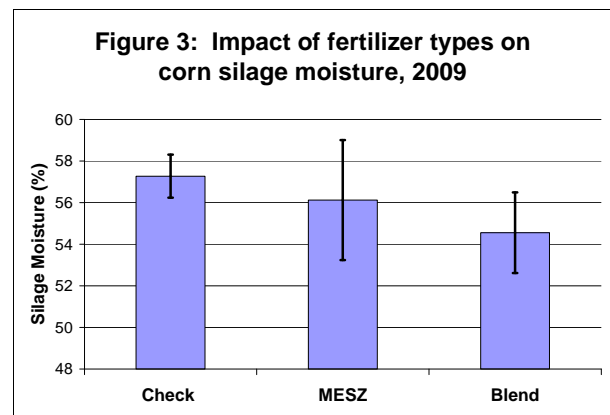
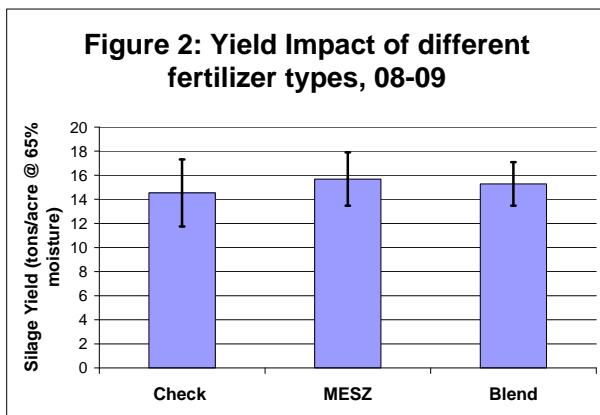
Extremely wet conditions in the fall of 2007 prevented harvest as corn silage, but cobs were hand sampled from sections of each treatment to estimate grain yield. The results are shown in Figure 1.

There did appear to be a significant yield response to both starter treatments above the check, and of the MESZ above the blended fertilizer. However, the difference in the sulphur contents of the two starter treatments, and the presence of sulphur deficiency symptoms, suggests that the response was due to the sulphur addition rather than the formulation of the fertilizer.



2008-2009:

Yield differences in 2008 and 2009 were much smaller than in 2007, as shown in Figure 2. Yield responses in both years were similar, so only the average for the two years is shown. While there was a trend for MESZ to yield slightly more than either the blended fertilizer or the check, the differences were not statistically significant.



One difference that did stand out in 2009, when the weather was cool for the entire growing season, was that the addition of starter fertilizer when planting corn reduced the moisture content of the silage, indicating that it had a positive effect on corn maturity.

Summary:

- Responses to added fertilizer (including sulphur) were much smaller than in 2007, possibly due to history of manure use.
- Could not show a statistically significant yield response to either fertilizer treatment, although the trend was MESZ > MAP blend > check
- MESZ is at least as good as the blend of MAP, AS and Zn, but we cannot say it is better. The convenience of handling a single product where all these nutrients are needed may be the greatest benefit.
- Added starter fertilizer did improve dry down and maturity.

Next Steps:

Any further testing of this product should be targeted to soils that have shown a response to zinc in the past, and that are not receiving livestock manure.

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Location of Project Final Report: