



Co-Composting with Struvite: Enhancing Phosphorus Availability in Low-P Prairie Soils

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INTRODUCTION

- Phosphorus (P) is essential for plant metabolic processes and our global reserves of rock phosphate are rapidly depleting [1].
- Waste-water recycled P source struvite has shown success as a slow-P release fertilizer [2].
- There is opportunity to combine efforts in changing agricultural practices and create sustainable nutrient loops.
- By co-composting P amendments with organic materials, we can optimize P availability, sequester carbon, and upcycle nutrients [3].



Fig 1. Large Scale Compost Batches (>1 ton)



Fig 2. The 48h Finished Compost Extraction

We aim to evaluate the P availability and agronomic benefits of co-composting struvite and calcium phosphate (CalPhos) with organic amendments, targeting organic crop production.

METHODOLOGY

Materials	Mineral P	Sampling Time
Yard Waste	Cal Phos	Pre Compost
Food Waste	Struvite	Post Compost
Manure		Mature Compost

BIODIGESTERS

- Accelerate composting in 48 hours [4].
- Sawdust and water added to control conditions.
- Ammonia captured to retain nitrogen.

MEASUREMENTS

- Nutrient content (P, N, C, S, K), moisture, pH.
- Bioavailable P fractions *
- Microbial Species, Pathogens, Antibiotics *

*Ongoing

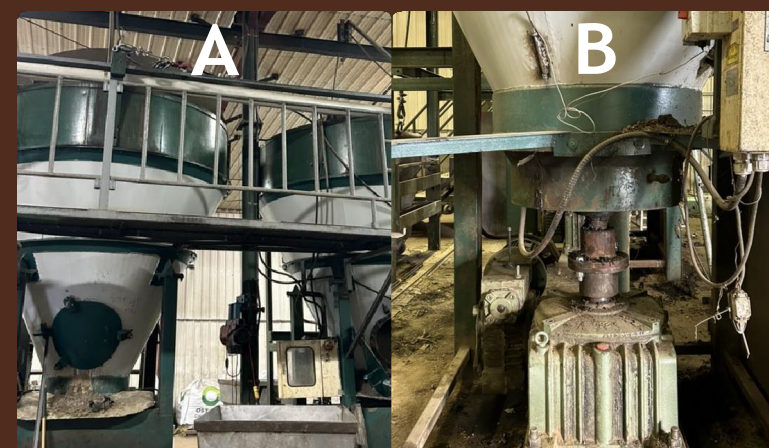


Fig 3. A) Rapid Biodigesters (RBD) at EnviroClean with B) Rotating Motor for Aeration Arm



Fig 4. Struvite Co-Composted Yard Waste A) Before B) After

DISCUSSION AND CONCLUSION

- Composting alone did not significantly increase available P.
- Addition of CalPhos and Struvite increased available P.
- CalPhos blends had significantly higher available P than Struvite blends.
- Within CalPhos, there was no significant difference between compost blends.



Fig 5. Post Compost Struvite and Manure

PRELIMINARY RESULTS

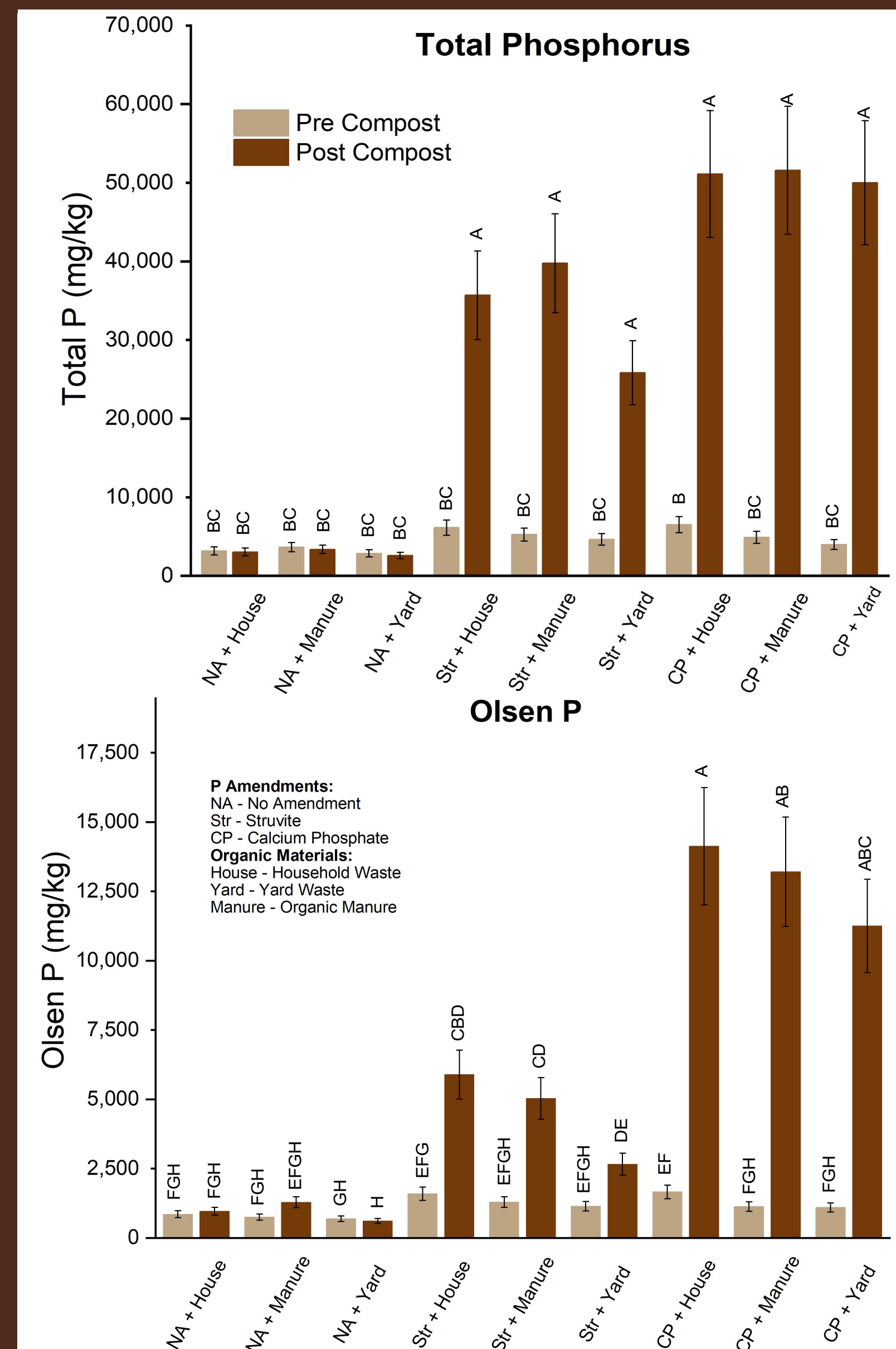


Fig 6. Pre and Post Composted Olsen P and Phosphorus levels across all compost blends (Mean +/- Std. Err.). Means with the same letters not significantly different from each other at $p > 0.05$

NEXT STEPS

Fractionation: Analyze labile and stable P fractions to assess bioavailability.

Mature Compost: Nutrient profiles and long-term P stability.

Pot Experiment: Plant growth and P uptake in low-P soils.

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ACCESSIBILITY



OSC4 WEBSITE



REFERENCES

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