



Can sludge improve germination and growth of plants?

INTRODUCTION

- Nutrient recycling provides an opportunity to increase self-sufficiency and to save energy in agricultural production.

- Sludge is rich in nutrients such as nitrogen and phosphorous and contains valuable organic matter.

- The objective was to study the effect of sewage sludge, biogas sludge and synthetic fertilizer applications on germination and growth of maize, fiber hemp and oilseed rape in two different soil type.

METHODOLOGY

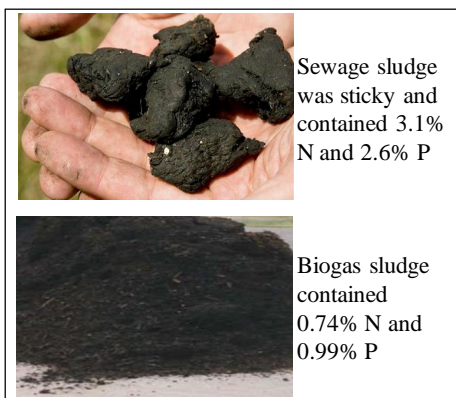
- Two pot experiments were conducted in the glasshouse with maize (*Zea mays* L., cv. Ronaldino), fiber hemp (*Cannabis sativa* L., cv. Uso 31) and oilseed rape (*Brassica napus* L. ssp. *oleifera* (DC.) Metz., cv. Wildcat).

- One hundred seeds were sown in each pot containing either 5 kg soil or 4.5 kg sand mixed with unfertilized peat.

Treatments:

- Soil+sewage sludge (T1),
- Soil+fertilizer (T2),
- Sand mixed with peat+sewage sludge (T3),
- Sand mixed with peat+fertilizer (T4), and
- Soil+biogas sludge (T5).

Each species required a different amount of N. The amount of sewage sludge, biogas sludge and synthetic fertilizer used was adjusted according to their N content.



Measurements:

- Germination (%)
- Root length (cm)
- Plant height (cm)
- Root dry weight (g) and
- Shoot dry weight (g).

RESULTS

- Sewage sludge added to soil or sand resulted in highest germination percentage (Figure 1).

- There were no significant differences between sludge and fertilizer treatments when plants were grown in soil (Figures 2 and 3).

- However, when plants were grown in sand, the sewage sludge application provided better growth than the fertilizer, showing that sewage sludge could provide plants with adequate nutrition.

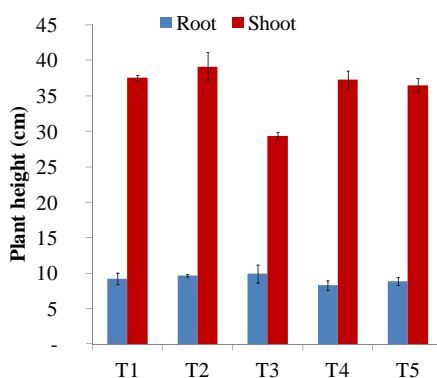


Figure 2. Effect of sewage sludge, fertilizer and biogas sludge on plant height (cm) of maize.



Figure 1. Growth of maize with sewage sludge, biogas sludge and chemical fertilizer in soil and sand.

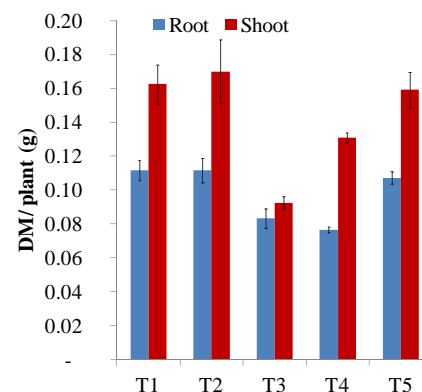


Figure 3. Effect of sewage sludge, fertilizer and biogas sludge on root and shoot dry weight of maize.

CONCLUSION

- There was no evidence of heavy metal and metalloids stress resulting from sewage sludge application.
- Sludge usage led to improvements in germination and plant growth.
- Depending on soil type, sludge can improve the growing conditions and yield considerably.

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