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Formerly
Ludwig Boltzmann
Institute for
Biological
Agriculture and
Applied Ecology



Long-term effects of biowaste compost fertilization on crop yield and nutrient supply, soil humus and nitrogen leaching

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How does biowaste compost
fertilization affect
crops and environment?



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. Soil and climate

Site: Obere Lobau near Vienna
Molli-gleyic Fluvisol
Avg. annual temperature: 10.4 °C
Avg. annual rainfall: 542 mm



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. Soil and climate

. Compost

Biowaste compost
produced at composting plant of City of Vienna
from source separated organic waste
(40 % organic household waste +
60 % yard trimmings)

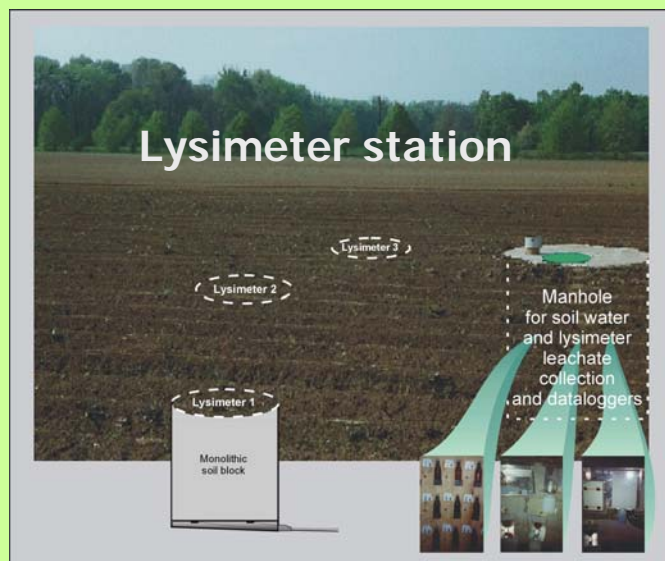


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- . **Soil and climate**
- . **Compost**
- . **Crop rotation**
 - 75 % cereals (winter wheat, rye, oats, spelt, winter barley)
 - 25 % potatoes
- . **Management**
 - Organic farming
 - According to EU regulation 2092/91
 - With customary farm machinery
- . **Lysimeter station**



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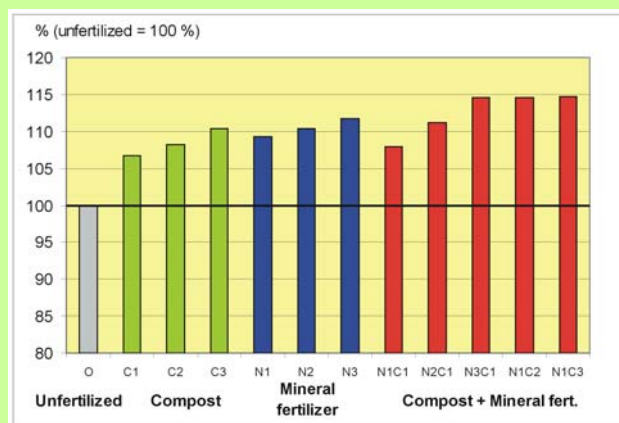
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Results



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Yields 1993 - 2006



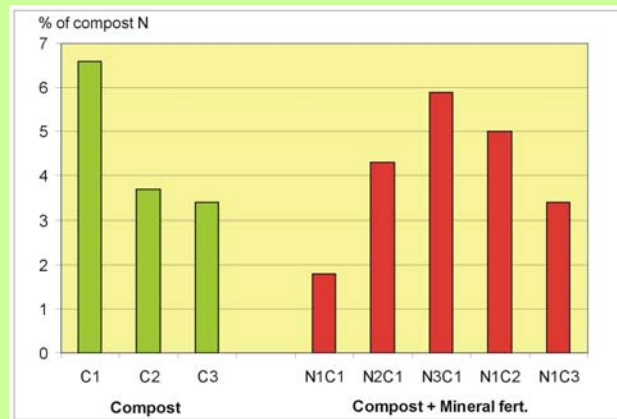
- Tendency: yield response increasing with time
- Crop quality good



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Fertilizer value - Nitrogen

- Nitrogen recovery from compost



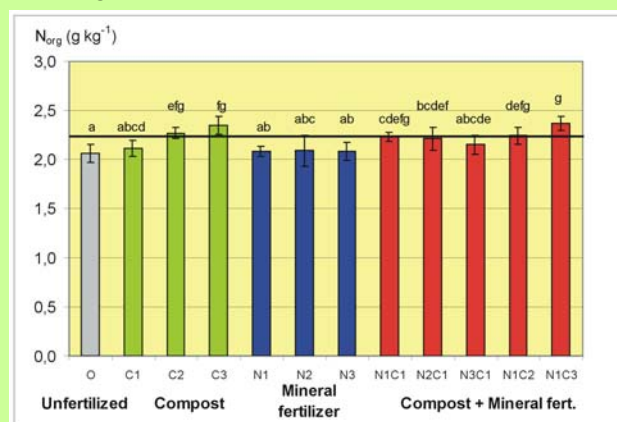
→ N from compost is released slowly



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Fertilizer value - Nitrogen

- N_{org} in the soil



→ a large part of compost nitrogen is tied up in organic matter



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Fertilizer value - phosphorus and potassium

- **Plant phosphorus and potassium contents
as high as with mineral P and K fertilizer**
- **Available concentrations in soil increased**
- **Total soil concentrations tended to increase**



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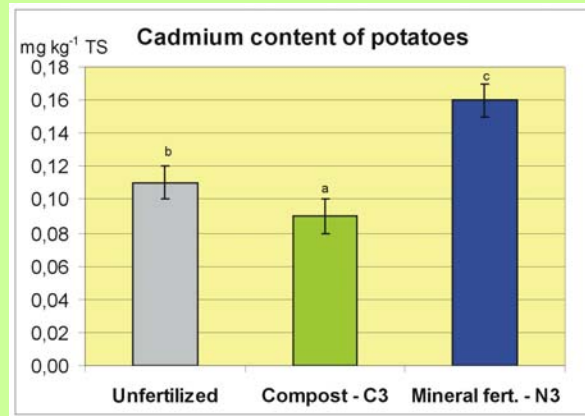
Fertilizer value - phosphorus and potassium

- **as well available as in mineral fertilizer**
- **total P and K can be accounted for
in fertilizer calculation**



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Fertilizer value - phosphorus and potassium



→ Cadmium in compost is bound to organic matter
and may be less plant available than Cd in mineral fertilizer



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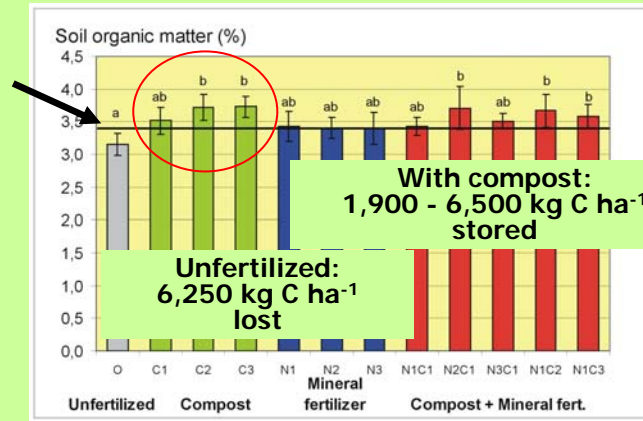
Nitrogen leaching

→ no risk for groundwater eutrophication
on the medium term



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Soil organic matter



→ benefits soil fertility

→ medium-term carbon sequestration



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Conclusions

- Yield increase and nitrogen fertilizer value moderate
- Phosphorus and potassium - high availability
- Groundwater quality not affected
- Soil organic matter content increased - carbon sequestration



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Thank you for your attention!