

# Co-Incorporation of Vegetable Crop Residues with Immobilizing materials for Reducing Nitrate Leaching Losses

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## INTRODUCTION

Crop residues of field vegetables are often characterized by large amounts of biomass with a high N content. Even when these residues are incorporated in autumn, high rates of N mineralization and nitrification still occur causing important N losses through leaching. Crop residues thus pose a possible threat to meeting water quality objectives, but at the same time they are a vital link in closing the nutrient and organic matter cycle of soils. Different management strategies to reduce N losses from crop residues are evaluated.

## PROJECT SET-UP

### Evaluation of two fundamentally different management strategies

#### On-field treatment

##### Long term field experiments (18 months)

Inclusion of non-vegetable crops or catch crops in vegetable crop rotations  
Simulation of long term N dynamics using EU\_rotate\_N

##### Short term field experiments (2 – 6 months)

- comparison between:
  - (i) conventional crop residue incorporation
  - (ii) leave crop residues untouched on field
  - (iii) total removal of crop residues
- Undersow of catch crops
- Application of immobilizing materials
- In situ stabilization

#### Removal and valorization

- Mechanization of crop residue removal
- Ensilage
- Composting
- Co-digestion

Two field experiments evaluating the potential of immobilizing materials were set up and will here be discussed in more detail.

## MATERIALS AND METHODS

- Cauliflower crop residues (*Brassica oleracea* var. *botrytis*)
- Incorporation mid November
- Immobilizing materials:
  - immature green waste compost (50 t ha<sup>-1</sup>)
  - cereal straw (12 t ha<sup>-1</sup>)
  - corn straw residue (12 t ha<sup>-1</sup>)

### Procedure

#### Field experiment 1

1. Refinement of crop residues
2. Application immobilizing materials
3. Incorporation

#### Field experiment 2

1. Application immobilizing materials
2. Incorporation

## RESULTS

### Field experiment 1 (Fig. 1)

- Cereal straw appears to immobilize N
- Limited effect of corn straw residue
- No effect of immature green waste compost

### Field experiment 2 (Fig. 2)

- No effect observed for all co-incorporated materials

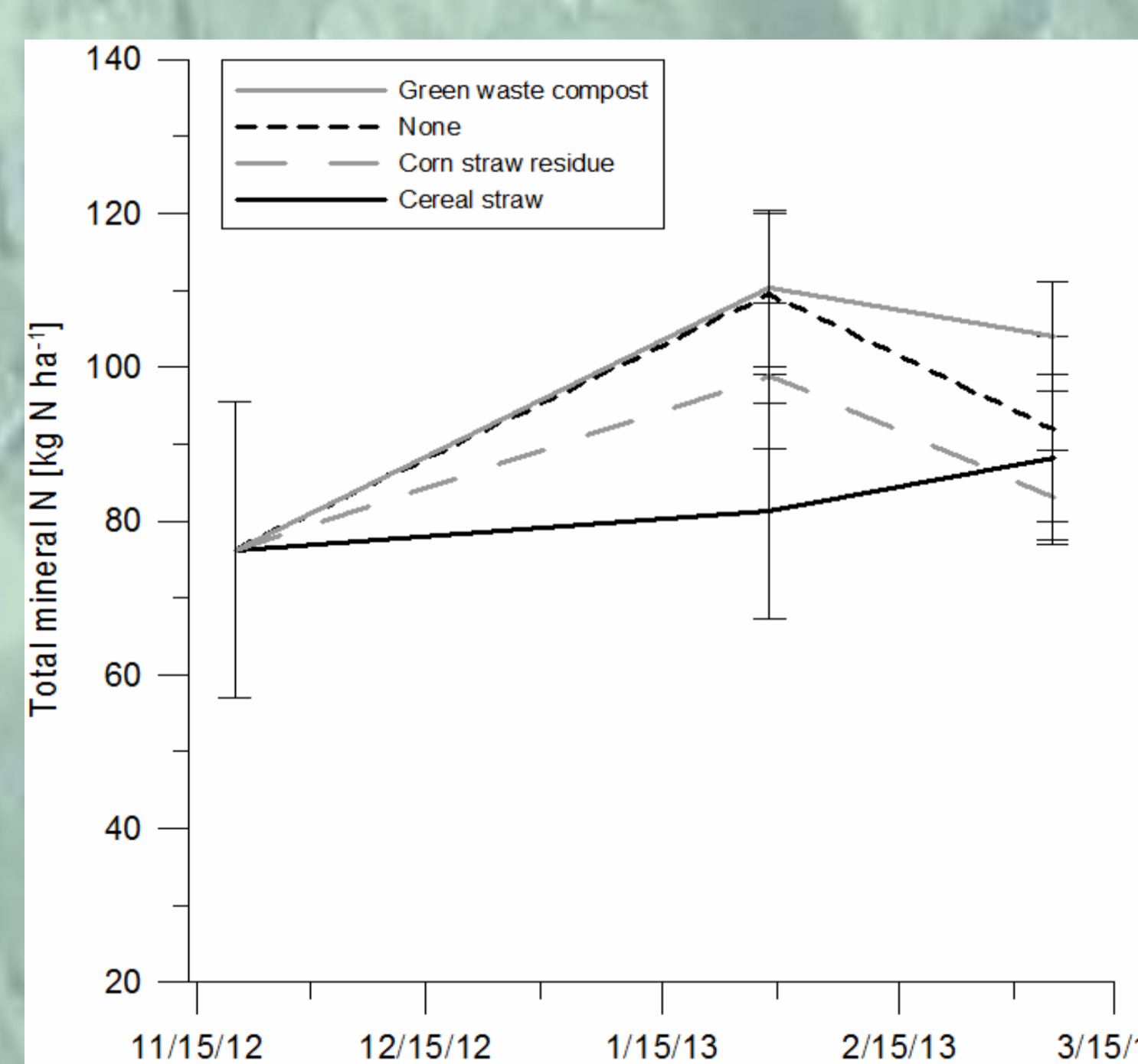


Fig. 1: Measured soil mineral N-content of the 0 – 90 cm soil layer at field experiment 1.

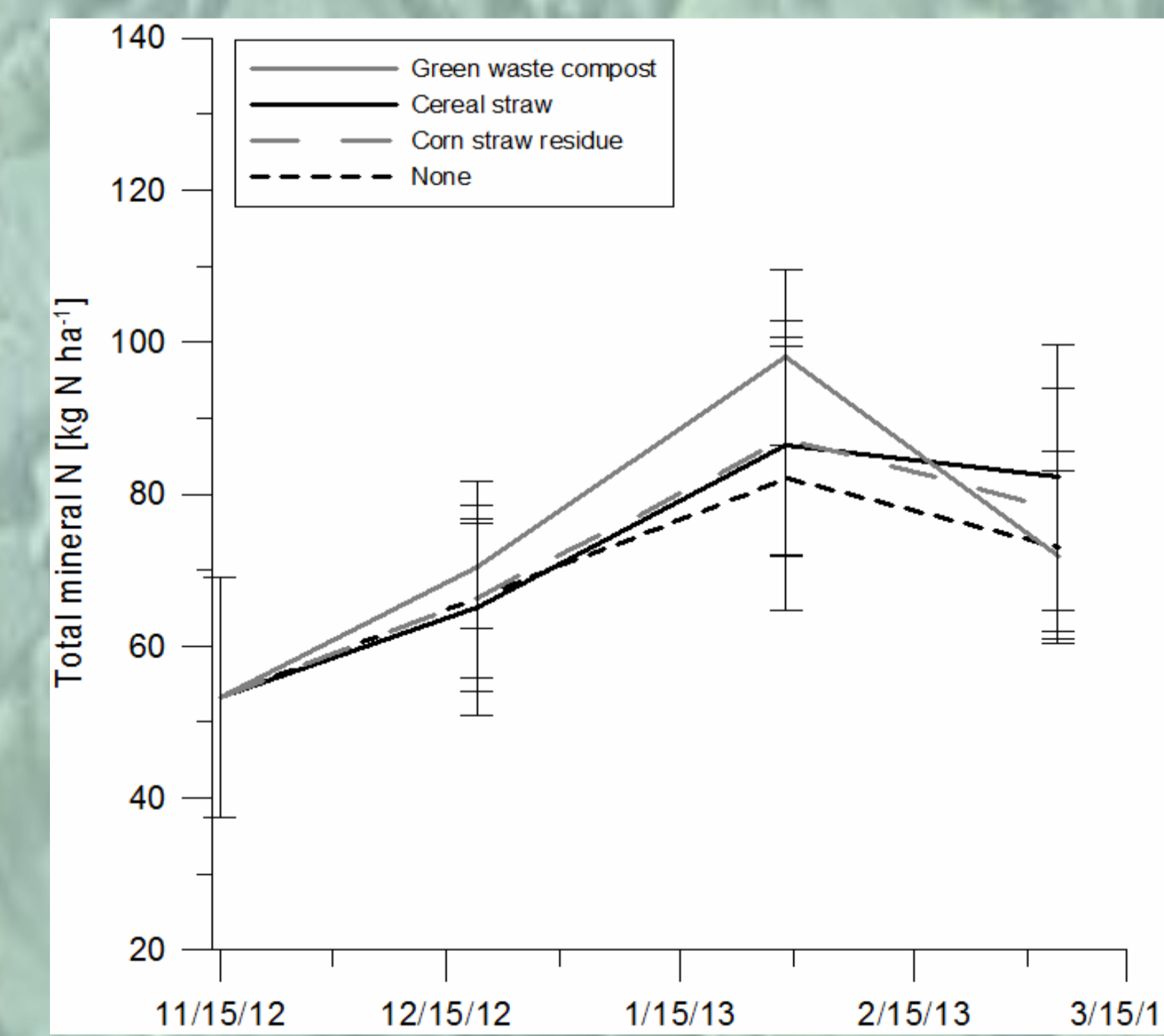


Fig. 2: Measured soil mineral N-content of the 0 – 90 cm soil layer at field experiment 2.

## CONCLUSION AND PERSPECTIVES

Sufficient and homogeneous mixing of crop residues and immobilizing materials appears to influence immobilization efficiency of the materials. The best potential to immobilize N was achieved with cereal straw. Results of the management options will be presented at the Nutrihort conference (16-18 September 2013, Gent).

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Nutrihort conference: <http://www.ilvo.vlaanderen.be/nutrihort>