

# Sheepwool as Fertilizer for Vegetables and Flowers in Organic Farming

**Böhme, M. H.<sup>1</sup>, Pinker, I.<sup>2</sup>, Grüneberg, H.<sup>2</sup>, Herfort, S.<sup>3</sup>**

<sup>1</sup> - Humboldt University of Berlin, Department Horticultural Plant Systems, Lentzeallee 75, D-14195, Berlin, Germany,

<sup>2</sup> - Humboldt University of Berlin, Department Horticultural Plant Systems, Germany,

<sup>3</sup> - Institute for Agricultural and Urban Ecology Projects at Humboldt University of Berlin, Germany

## Background

The availability of fertilizers for organic farming is often limited and not standardized. Use of easily decomposable organic waste materials as horn- or blood powder of is often not accepted, because healthy risk. Therefore searching for other organic fertilizers is still necessary.

In Germany, high amounts of uncleaned sheepwool are available, currently only waste material. Because of the high amount of nutrients especially nitrogen in the sheepwool, sheepwool pellets were tested as multi-functional fertilizer in vegetable and flower cultivation.

## Sheepwool pellets



Mineral content in g per kg DM:  
 NO<sub>3</sub> – 0.11, P – 0.93, K – 43.5, Mg – 0.49  
 Total N – 10.5%, DM -95.2%  
 pH 7.5 – 9  
 EC - 8,8 mS/cm  
 Can be stored for 2 years  
 Increasing soil activity /respiration  
 Water retention

## Sheepwool pellets

The development of this organic fertilizer was realized in two steps

-The technology for producing of the pellets with different components was developed in order to combine good structure and an acceptable decomposition rate.

-Pellets with a total nitrogen content of 10 to 11% DM and different supplements (10% cellulose, 20% potato starch, 20% casein) were mixed in substrates and added to the soil in the open as fertilizer for ornamental plants and vegetables.

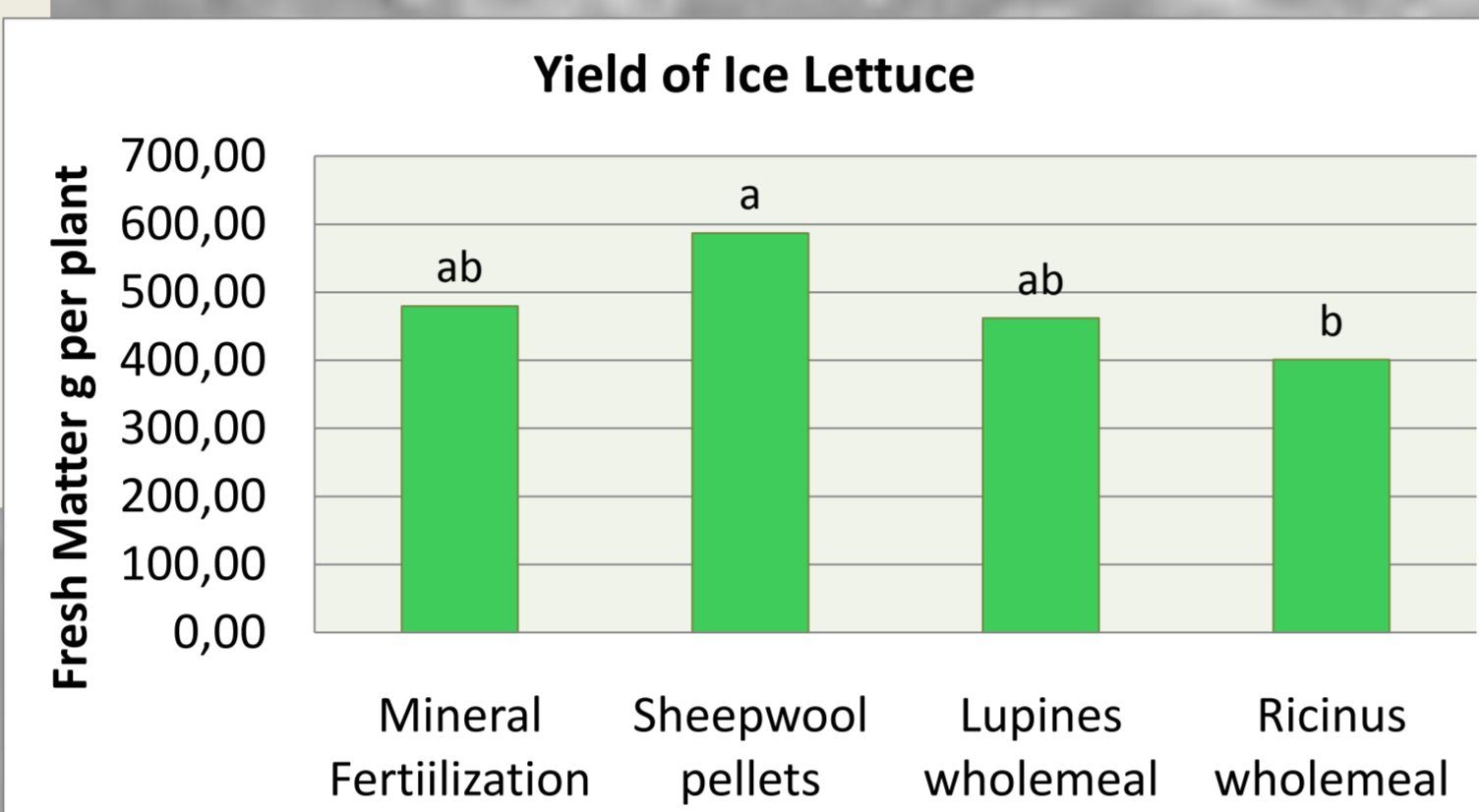
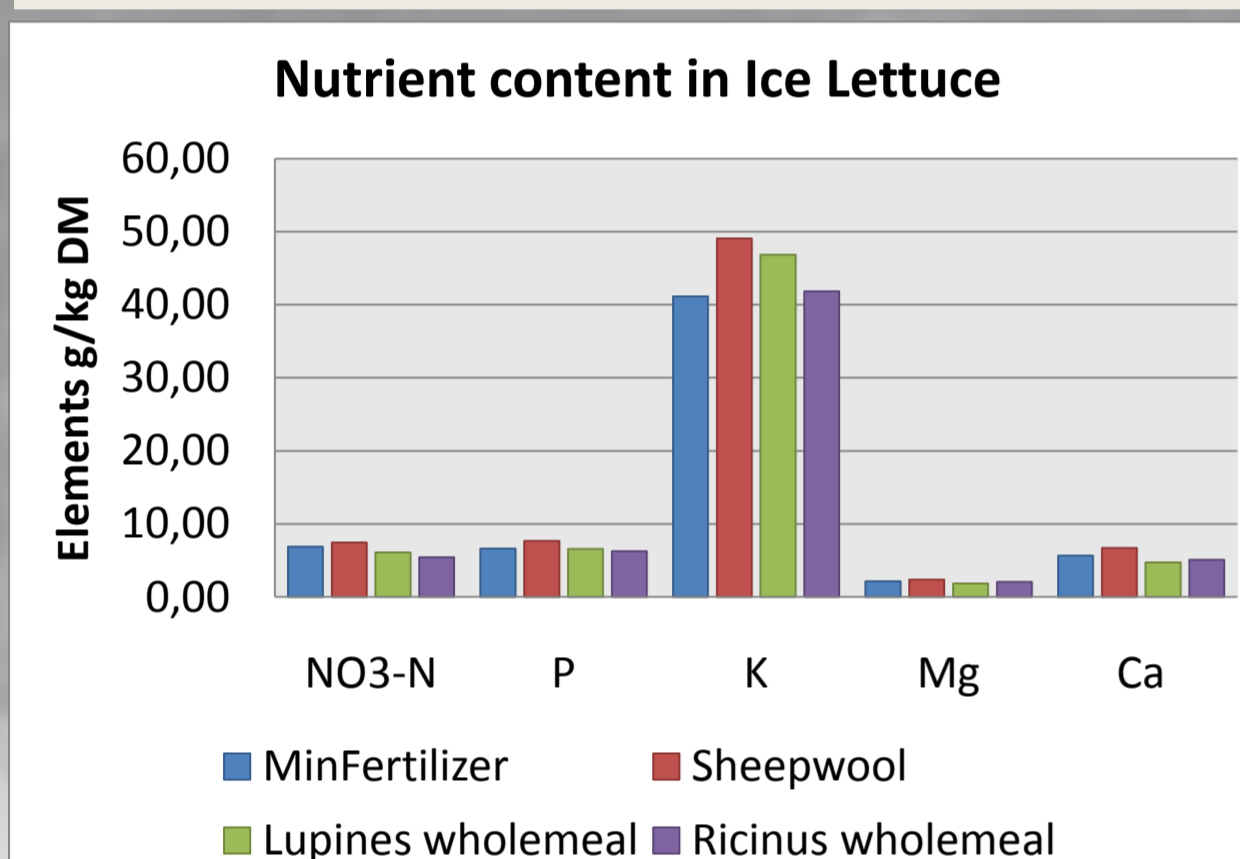
## Vegetable field cultivation

### Iceberg lettuce cv. Elenas RZ

planting 06<sup>th</sup> June, harvest 12<sup>th</sup> Sept.

plant density = 7,4 plants/m<sup>2</sup>

Fertilizer: Kalkammon salpeter(26%N) 46g/m<sup>2</sup>  
 Sheepwool pellets(10%N) 120g/m<sup>2</sup>  
 Lupines wholemeal (6% N) 200g/m<sup>2</sup>  
 Ricinus wholemeal (5%N) 240g/m<sup>2</sup>



In the field cultivation of iceberg lettuce the best results in all quantitative and quality parameters were obtained in the variant with sheepwool pellets.

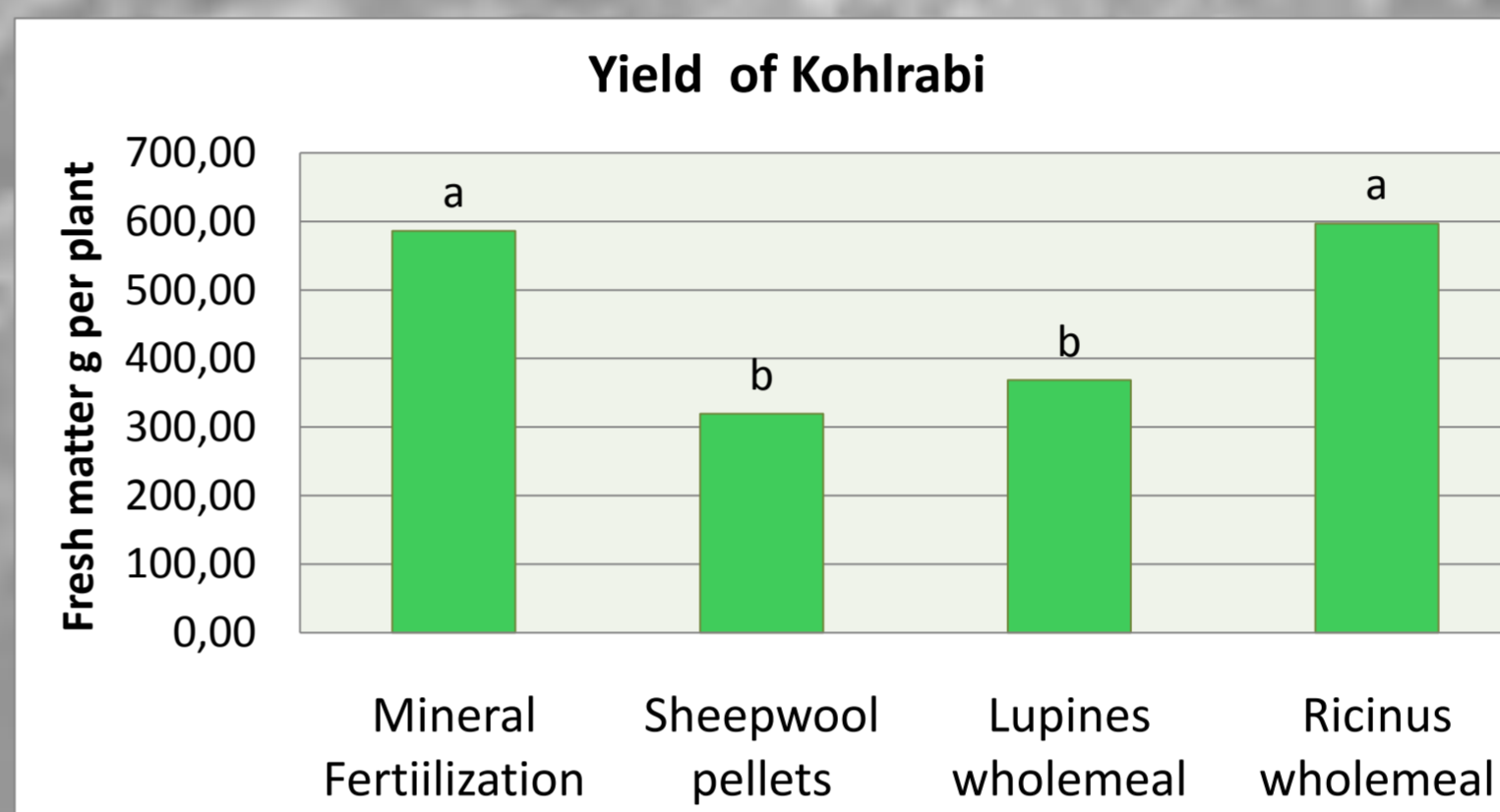
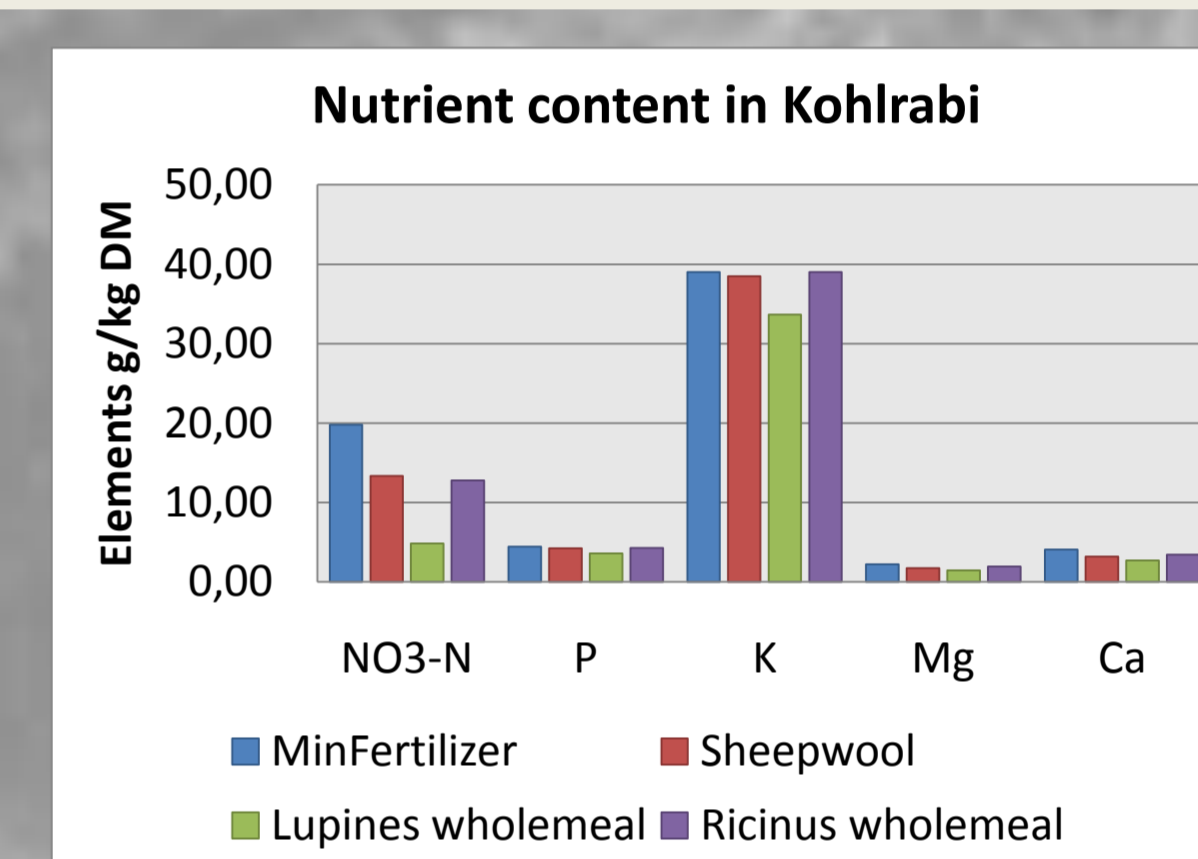
In kohlrabi, however, the yield in the variant with pellets was lower than with mineral or Ricinus wholemeal fertilizers but comparable with Lupines wholemeal. The percentage of marketable fruits was somewhat higher in the organic fertilization.

### Kohlrabi cv. Eder RZ

planting 06<sup>th</sup> June, harvest 05<sup>th</sup> Sept.

plant density = 7,4 plants/m<sup>2</sup>

Fertilizer: Kalkammon salpeter (26%N) 65g/m<sup>2</sup>  
 Sheepwool pellets (10%N) 170g/m<sup>2</sup>  
 Lupines wholemeal (6% N) 283g/m<sup>2</sup>  
 Ricinus wholemeal (5%N) 340g/m<sup>2</sup>



## Vegetable greenhouse cultivation

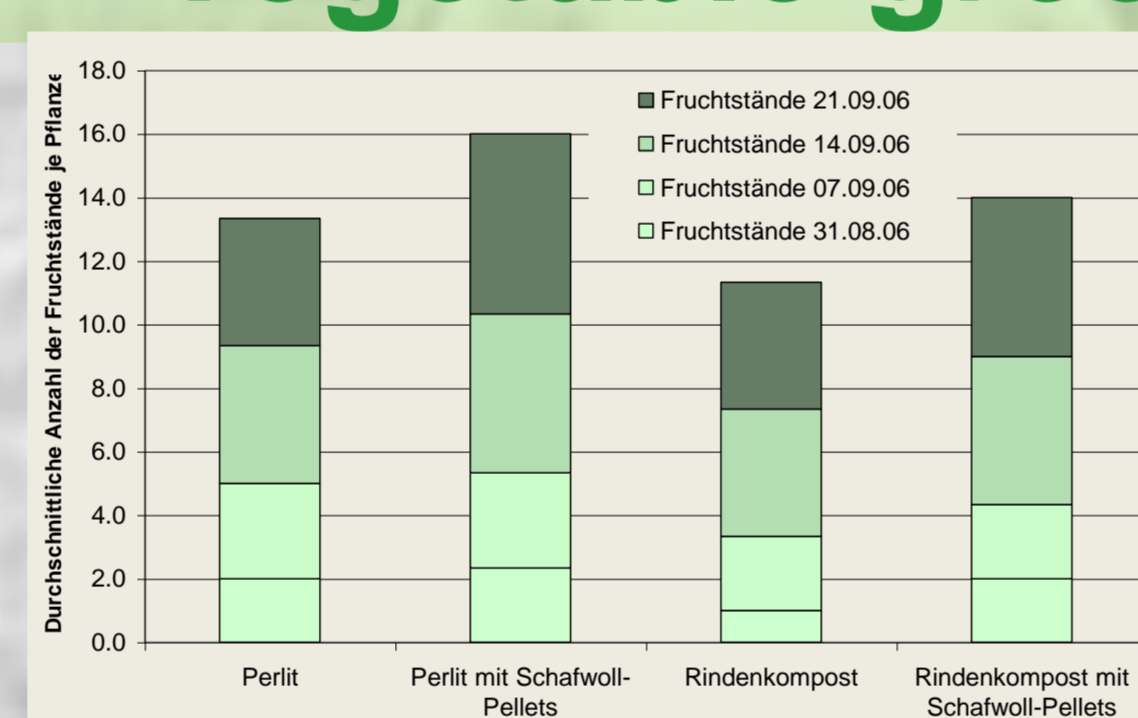
### Tomato cv. Alkasar GR

Planting 08<sup>th</sup> Aug., harvest 28<sup>th</sup> Sept. – 15<sup>th</sup> Febr. (4.5 months)

Plant density: 1.8 plants/m<sup>2</sup>

in substrate culture: perlite, bark compost

- With standard mineral nutrient solution or 100g sheepwool pellets per plant



Content [mg/100 g FM]	Perlite	Perlite with Pellets	Bark compost	Bark compost with Pellets	Literature-values <sup>[1]</sup>
NO <sub>3</sub> <sup>-</sup>	90.31	103.19	96.26	96.07	<500
P	18.73	20.28	19.21	18.31	26
K	242.75	236.71	257.57	244.81	242
Mg	9.66	9.84	11.06	9.70	13
Ca	6.08	5.47	5.20	5.48	14
Sugar/Acid-Ratio	9.70	9.8	10.1	8.8	5-10

Due to the additional organic fertilization through the sheepwool pellets the yield was increased on perlite by 19.6% and on bark compost even by 45.3%.

The fruit quality measured as mineral content was not affected by substrat or fertilization.

## Flower pot plant cultivation

### Euphorbia pulcherrima cvs. Primero and Tosca

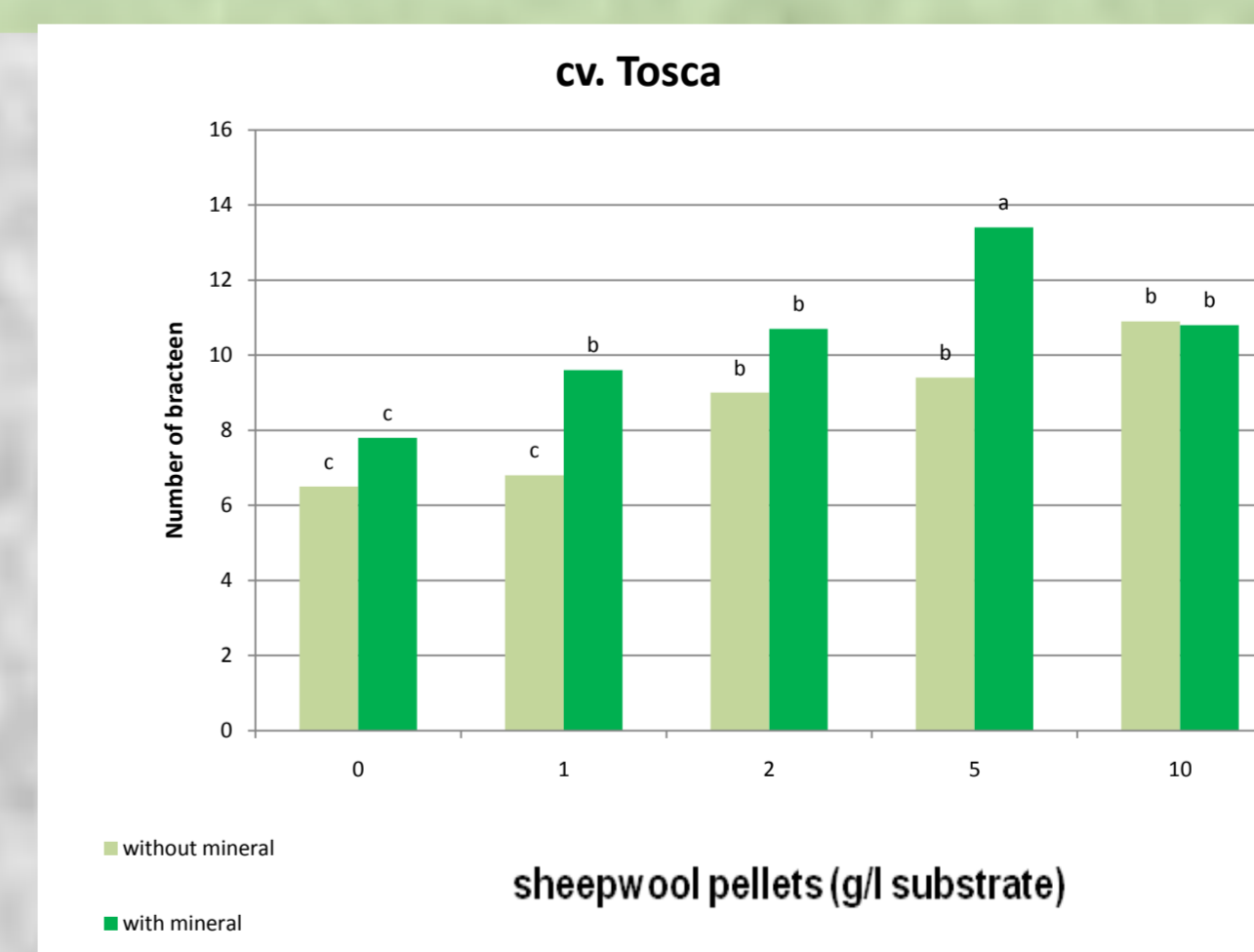
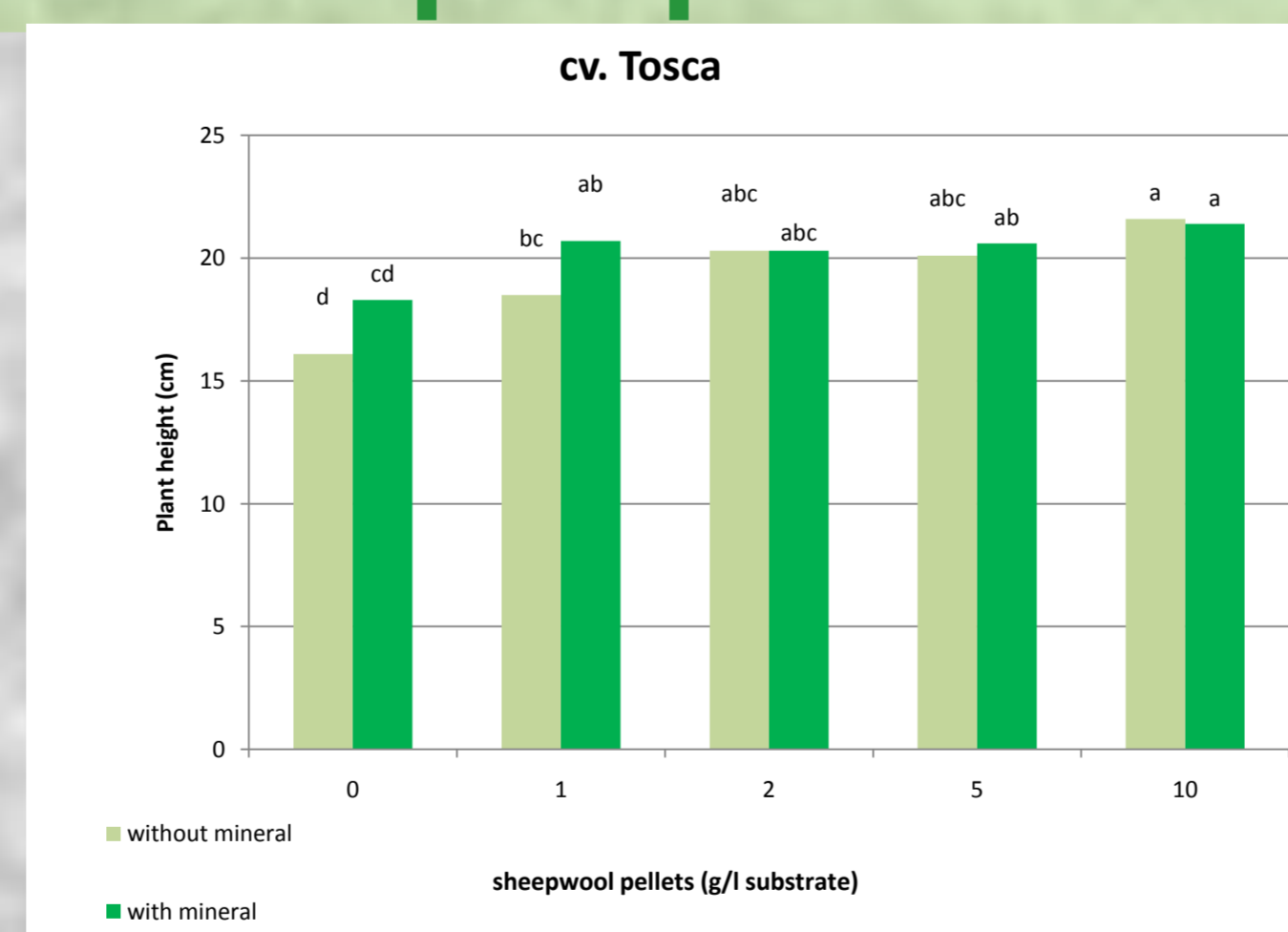
Planting 31st Aug., final evaluation 05<sup>th</sup> Dec.

15 plants per variant

Substrate: peat with clay

Variant A: Sheepwool-pellets (0, 1, 2, 5 and 10 g per liter substrate mixed before planting).

Variant B: as variant A but additional mineral fertilizer (Cristalon blue 0.15%, 40 ml/pot and Wuxal 0.1% weekly).



In Euphorbia pot cultivation sheepwool pellets could be used as fertilizer and the mineral fertilizer could be substituted completely.

The required pellet concentration was cultivar dependent and cv. Primero required more pellets for optimal fertilization than cv. Tosca.

Organic and mineral fertilizers could be applied together in order to support the plant development optimal.

## Conclusion

In most cultures a stimulating effect of the pellets on growth and yield could be determined in comparison with mineral and other organic fertilizer.

We can suggest these pellets as fertilizer in organic cultivation in protected and open areas.

Analyses of the nitrogen content in substrate and in plants indicated that sheepwool pellets can be used as slow releasing nitrogen source.

Problems can be arise because of the high initial pH and EC values.