ADVISORY SERVICE — THE SAME METHODS?

Today the advisory service uses different methods to evaluate the amount of nutrient elements in growing media. Spurway/Lakanen, CAT, distilled water, and Al-extract (Daldorff, 1999) are different methods used in Scandinavia. A change to new methods of analysis can cause problems because we don't have enough experience and normative references to new values. We should use common methods in the advisory service. Nutrient elements given in the literature as a norm for relevant amount in growing medium are worthless unless the method of analysis is given. Reference values must be given for every method. Do we still want different methods of advice and the labeling of growing media?

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Self-Heating in Peat

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INTRODUCTION

Favourable physical and chemical properties as well as a low content of weeds and pathogens make peat an ideal growing medium for plants. From harvesting till processing the peat is stockpiled. During this storage period self-heating may occur. Self-heating causes not only substantial losses of peat (Gärdenäs and Thörnqvist, 1984), but also results in a peat product that may inhibit seed germination and plant growth (Wever and Hertogh-Pon, 1993).

MATERIALS AND METHODS

Peat samples were collected from different mires in Norway being exploited for horticultural use. Seeds of lettuce (*Lactuca sativa* L. 'Rubett') were grown in these peat samples exposed to different levels of self-heating. Chemical analyses of the peat samples were performed by traditional methods (Ranneklev et al., 2000). Total organic carbon (TOC) and chemical-oxygen demand (COD) were measured in the water extract from the pH measurements. Total organic carbon indicates the content of organic matter, while COD indicates a combination of content and type of easily oxidised organic matter.

RESULTS

Self-heating caused changes in the water extract from the peat (Table 1). Total organic carbon and COD increased after self-heating, while the content of NO_3-N decreased. A reduction in pH could also be observed after self-heating, although this reduction was not statistically significant.

Self-heating of peat reduced the germination percentage of lettuce seeds. Severe effects were obtained when peat samples were exposed to temperatures above 45°C, which is in accordance with observations made by Wever and Hertogh-Pon (1993). Germination percentages lower than 87±6% (standard deviation) should not be accepted. Germination percentages and temperatures measured in the peat at sampling were not well correlated ($r^2 = 0.08$). This indicates that the production of toxic compounds is not only dependent on temperature. Factors like peat quality and exposure time to the elevated temperature may be of importance. In addition, the activity of toxic compounds may be dependent on pH and ionic strength. Correlations between different chemical parameters are given in Table 2. Chemical-oxygen demand and TOC were highly negatively correlated to the germination percentage of lettuce, and as indicated in Table 1, self-heated peat had considerably higher COD values.

CONCLUSION

- Toxic compounds were produced in peat exposed to temperatures above 45°C.
- Reduced pH was observed in peat exposed to self-heating, which may require an additional supplement of lime.
- Losses of nitrate were observed after self-heating. In another study by Ranneklev et al. (2000) self-heated peat was more susceptible towards losses of nitrate during storage.
- A COD value higher than 25,000 and a germination percentage below 87±6% indicate that the peat sample had been self-heated.

Table 1. Chemical properties of peat. Total organic carbon, chemical-oxygen demand, and NO_3-N are given in mg kg^{-1} dry matter.

	Self-heated	Not self-heated[X]
pH	3.55	3.70
NO_3-N	7.1*	13.5
TOC[Y]	9726*	4415
COD	25,838*	11,861

[X] peat exposed to temperatures above 35°C.
[Y]Abbreviations: TOC = total organic carbon, COD = chemical-oxygen demand.
* significant difference at $p < 0.05$.

Table 2. Correlation between different parameters.

	pH	COD[X]	TOC	NO_3-N	Ger (%)[Y]
pH	1.00				
COD	-0.65	1.00			
TOC	-0.65	1.00	1.00		
NO_3-N	0.68	-0.11	-0.11	1.00	
Ger (%)	0.42	-0.67	-0.68	-0.13	1.00

[X]Abbreviations: TOC = total organic carbon, COD = chemical-oxygen demand, GER = germination.
[Y] germination percent of lettuce seeds.

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