Organic growing media and organic fertilizer’s chemistry drive microbial catabolic functions in soilless horticulture.

Louise Paillat, Patrice Cannavo, Lydie Huche-Thelier, Fabrice Barraud, René Guénon

To cite this version:


HAL Id: hal-02869826
https://institut-agro-rennes-angers.hal.science/hal-02869826
Submitted on 17 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire HAL, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.
OBJECTIVE

How organic fertilization does affect microbial catalytic functions in growing media ?

RESULTS

N limitation in Growing Media

Higher respiration rates:
• With N-sources
• Mostly in Bark

SIR rates affected GM and fertilizer types (mg CO2-C L-1 h-1)

SIR rates affected GM and fertilizer types (mg CO2-C L-1 h-1)

Discussion and conclusions

• Fertilizers turned on microbial activity depending on GM
  • The burst in SIR after 7 days in Coir and Peat indicates a strong C-demand (or C-capacity), especially for simple compounds (saccharides).
  • Microbes in Bark are more prone to degrading recalcitrant C-forms (e.g. Horn).
• CLPPs showed contrasted microbial C, N, P use efficiency depending on fertilizer type
  • Higher SIR intensities with F2: N and P were limited especially high in Coir.
  • Higher respiration rates: 0 NPK > F2 > F1 > Peat

• SIR rates affected after 7 days and slowed down after 56 days: 10 to 1 fold ratio for both coir and peat and 3 1 fold for bark

• SIR rates after 7 days: Coir > Peat > Bark
  • Coir: C induced respiration with F1, C and P induced respiration with F2
  • Peat: C induced respiration with F1 and F2
  • Bark: N induced respiration with Horn

• SIR rates after 56 days: GM had similar CLPPs but with different intensities (Bark > Coir > Peat)
  • F2 induced higher SIR (C, N and P)
  • Weak effect with both F1 and Horn

EXPERIMENT

Growing Media Fertilizers

<table>
<thead>
<tr>
<th></th>
<th>C:N</th>
<th>C:P</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEAT</td>
<td>3.3</td>
<td>17</td>
</tr>
<tr>
<td>COIR</td>
<td>5.5</td>
<td>25</td>
</tr>
<tr>
<td>BARK</td>
<td>13.8</td>
<td>72</td>
</tr>
</tbody>
</table>

INCUBATION

(25°C, 60% of water holding capacity)

REFERENCES

