The effect of effective microorganisms on the growth and the nutrient content of tomato transplants

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Introduction

- Effective microorganisms (EM) technology was first developed in the 1970’s.
- EM is a mixture, containing primarily lactic acid bacteria, photosynthetic bacteria, and yeast, maintained at pH 3.5.
- EM suppress the incidence of pests and diseases, solubilize minerals, conserve energy, increase photosynthetic efficiency, and fix biological nitrogen.

PROBLEM: Elongated, low quality tomato variety ‘Valve’ transplants.

AIM: The purpose of this investigation was to assess the influence of effective microorganisms on the growth and nutrient content of tomato transplants.

Materials and Methods

Experimental site and time:
Estonian Crop Research Institute greenhouses, Winter of 2014

Substrate:
Peat-based mixture fertilized with Peat Care 11-25-24 (2 kg m⁻³), magnesium sulphate (0.5 kg m⁻³) and mixed with dolomite lime (7 kg m⁻³).

Treatments:

<table>
<thead>
<tr>
<th>Item</th>
<th>EM treatment</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seeds soaking 0.5 hour</td>
<td>EM 1:500 solution</td>
<td>Water</td>
</tr>
<tr>
<td>Substrate treatment</td>
<td>EM 1:500 solution</td>
<td>Water</td>
</tr>
<tr>
<td>3 true leaf stage spraying</td>
<td>EM 1:1000 solution</td>
<td>Water</td>
</tr>
<tr>
<td>1 week later</td>
<td>EM 1:1000 solution</td>
<td>Water</td>
</tr>
<tr>
<td>1 week later</td>
<td>EM 1:1000 solution</td>
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</tr>
</tbody>
</table>

Repetitions and experimental design:
Randomized block design, plot size 6 plants, 4 replications, experiment repeated 2 times.

Laboratory analyses:
N, P, K, Ca, Mg content

Statistics:
ANOVA by Excel 2010, comparison of means by Fisher LSD test

Table:
The contents of nitrogen, phosphorus, potassium, calcium, and magnesium in tomato transplants dry matter (%).

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>Ca</th>
<th>Mg</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM treatment</td>
<td>4.0 ***</td>
<td>0.73 *</td>
<td>5.0 **</td>
<td>2.3 **</td>
<td>0.68 *</td>
</tr>
<tr>
<td>Control</td>
<td>2.9</td>
<td>0.60</td>
<td>3.7</td>
<td>1.9</td>
<td>0.60</td>
</tr>
</tbody>
</table>

Figure:
The picture of tomato transplants: on the left – EM treatment, on the right – Control treatment

Conclusion:
Tomato transplants stay compact, have thicker stems and contain more nutrients in EM treatment.

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