THE INFLUENCE OF CHEMICAL FERTILISERS WITH MICROELEMENT ON B\textsubscript{1} AND B\textsubscript{6} VITAMINS CONTENT ON GARDEN PEA. II. PARTIAL RESULTS

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Abstract. Chemical fertilisers with microelements are remarked by the permeability and excellent solubility , which bring a great performance in these utilisation on all types of vegetal cultures, and could be applied as much on the leafs and radicular, through all the methods of irrigation. Using these types of fertilisers in well established doses, depends on the fertilised vegetal species and the followed results, in the situation of Papilionaceae family it will be favoured the roots development are growth, fruits quality improving and B\textsubscript{1}, B\textsubscript{2} and B\textsubscript{6} vitamins biosynthesis stimulation.

Because it is well known the action the biochemical role of thiamine and pyridoxine in the alive organism, in this work tried to demonstrate that the chemical fertilisers administration with microelements during the vegetation stage of pea’s, cause a qualitative superior products obtaining. In this senses it was remarked the increasing of capsules number and beans mass in pods, on the plant, respectively the thiamine contents increasing and the pyridoxine in the pea pods which came from fertilized plot.

INTRODUCTION

The administration chemical fertilizers with microelements to vegetable cultures in general and in a special way to peas and bean, stimulate the development of the foliar mass of the plants, assure an balanced nutrition, causing an harmonious development and stimulate a biosynthesis process of the hidrosoluble vitamins which are the thiamine, the riboflavin and the pyridoxine. (Andrews, so.on., 1999).

The action of the B\textsubscript{1} vitamin in the alive organism is complex, this having a fundamental role in a normal depletion of a metabolic basic process, especially under the way of his acid ester pirofosforic( TPP). It was remarked the fact as the B\textsubscript{1}vitamin presents an extremely favourably action on pea roots erasing, which demonstrate a big sensibility to thiamine action, even on $10^{-5}$ μg concentrations (Neamţu, 1996).

Regarding the vitamin B\textsubscript{6}, this below on three one structural forms, fulfil a multiple role, as much in the animal organisms and in vegetal organisms. In this sense, under the form of piridoxalfosfat, the vitamin B\textsubscript{6} assist reactions of degradation of some composed substances (monoaicids monosaccharide, heterocyclic compounds), in the process of the biosynthesis and to numerous interconversii between different class of compounds.
MATERIAL AND METHODS

Following the effect those two fertilizers with microelements on the contents of vitamins B1 and B6, were cultivated 18 experimental plots (6 variants and 3 repetitions) with the pea Bördi variety. The location of the plots in the field of experience is rendered in the figure 1.

![Diagram showing the distribution of the experimental plots fertilised in the experimental field]

For the vitamin B1 determination there were suggested spectrofotometric, colorimetric and chromatographic methods (Dumitrescu and Milu, 1997). The fluorimetric methods is based on thiamine oxidation on tiocrom and it is nowadays the method which have the most advantages regarding the fastness and the specificity.

In these conditions through thiamine oxidation with potassium fericianure in alkaline environment, the tiocrome will be formed, composed with a strong blue fluorescence in ultraviolet. For quantitative determination of B1 vitamin it was compared the standard
solutions fluorescence of the pure oxidised thiamine comparative with analyzed solutions with fluorometer. The standard thiamine solutions contains 10 mg thiamine chlorhidrate in 100 ml HCl 0,01n and 1 ml of these solution is diluted with distillate water deionisated at 100 ml. So, 1 ml of these solution is corresponding to 1 µg thiamine chlorhidrate.

The solution of $K_3Fe(CN)_6$ by 2% concentration is prepared in the day of utilisation and is kept in glass bottles by brown colour. It was used KOH 30% solution, $H_2SO_4$ 0,1 n solution, izoamilic alcohol(filtrated through animal coal to eliminate the fluorescence), $CH_3COONa$ 2,5 M solution which contains a phosphates enzymatic preparats, quinine chlorhidrat solution by 1 mg%.

The analysed product, respectively the pea seeds in fresh stage (5-10g) will follow a stage series in the purpose of linked thiamine liberation and after that for its oxidation in tiocrom (Perez-Ruiz ş.a., 2004). In the same time it was made a control probe, where the researched solution, comparative with the analysed probe, was not added an oxidative substance. The thiamine quantity is expressed in µg to one gram of analysed probe.

To determinate vitamin B₆ it was used high performance liquid chromatography (HPLC), which could be applied for thiamine and riboflavin dosage. Before that is necessary that the vitamins to be extracted from the product using tricloracetic acid 5%, the thiamine and the riboflavin being after that analysed through UV detection, and the pyridoxine through fluorimetric detection.

**RESULTS AND DISCUSSIONS**

After the fertilisers treatments that were made using soluble fertilisers with microelements, it was concluded significant variations, on none side on biologically potential elements on garden pea production and on some morphological and physiological characteristics, an don the other side on B₁ and B₆ vitamins quantity dosage in pea seeds obtained in 2...6 plot, comparative with witness plot. The obtained results are shown in table 1.

Table 1. The obtained results at technological maturity in experimental plot

<table>
<thead>
<tr>
<th>Biological elements of the production potential</th>
<th>Type of experimental parcel / n=3</th>
</tr>
</thead>
<tbody>
<tr>
<td>The hidrosolube vitamins content</td>
<td>1-witness 2 3 4 5 6</td>
</tr>
<tr>
<td>Weight of the bean pods harvested per parcel (g)</td>
<td>3760 5160 4150 5480 5200 5780</td>
</tr>
<tr>
<td></td>
<td>6100 5560 5560 5900 5740 6230</td>
</tr>
<tr>
<td></td>
<td>6280 6220 6480 6160 6000 6320</td>
</tr>
<tr>
<td>Average weight of 100 bean pods harvested per parcel (g)</td>
<td>610 622,0 589,09 664,44 650,0 623,0</td>
</tr>
<tr>
<td>Pods number per parcel (piece)</td>
<td>2484 2712 2236 2711 2456 2941</td>
</tr>
<tr>
<td>Vitamin B₁ (µg/g sample)</td>
<td>3,03 3,26 3,41 4,54 3,62 3,58</td>
</tr>
<tr>
<td>Vitamin B₆ (µg/g sample)</td>
<td>1,63 1,88 1,99 2,23 2,06 2,14</td>
</tr>
</tbody>
</table>

n – number of plot.

It was concluded that there are significant differences on seed weight in the pods which were harvested from fertilised plot, comparative with the witness plot. It was underlined an increasing of pods number in the fertilised plot with microelements comparative with witness plot.

From the table 1 is can be easily noticed the fact as that the utilization of increasing doses, rigorous established of fertilizers with microelements of types Universol and Ferticare, cause a growth of thiamine and pyridoxine content a to plot 2, 3, 4, 5 and 6
comparative with plot1 (witness). The work conditions presented and the analytical characteristics were used for the methods previously described.

CONCLUSIONS

The fertilisation of experimental plot cultivated with garden pea were realised with two types of chemical fertilisers with microelement, as Blue Universol and Ferticare I.

As a result of realised treatments those two types of fertilisers was concluded a pea’s pods mass increasing to all fertilised variants ($V_2, \ldots, V_6$).

The utilisation of those two fertilisers applied extra radicular in increased doses during the vegetative period, determined a thiamine and pyridoxine quantity increasing in the finite product, respectively the pea.

Even if the analysed probes was relatively small and the used methods are not automated performance, it was considered that the obtained results till this moment are relevant.

BIBLIOGRAPHY