

Researches Regarding the Biostimulators Effect Upon the Germination Capacities Seeds of Alfalfa

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Abstract

The carrying out of uniform forage crops represents an important technological loop for all agricultural species. The uniformity of these crops is caused especially by seed germination capacity, respectively by plant emergence capacity, depending upon the climatic and technological conditions. With regards to the researches carried out in this direction. We present here the influence exerted by some biologically-active products, used through extra-root application during plant vegetation period, upon seeds submitted to germination. The observations performed on alfalfa seeds have led to the conclusion that the per cent of germinated seeds ranges from 95.66%. In the untreated control variant, to 99.33% in the variant treated with the product Stimupro and Mega grow.

Keywords: biostimulants, germination, alfalfa

1. Introduction

Forage crops` uniformity is determined especially by seed germination capacity, then by plant emergence capacity.

The objective of this scientific work is to study the influence exerted by some biostimulant products upon the germination capacity of alfalfa seeds.

Perennial forage legume species, seed germination power is much lower than in other species. this being due to certain specific morphological characters of the seed. Such as the cell layer of the pericarp is more dense, the ability of external water penetration is lower, the percentage seed hard is higher. [1, 2, 3]

2. Materials and methods

In order to make evident the influence of some biologically-active products upon the germination

capacity of alfalfa seeds (*Medicago sativa L.*), we have settled an experimental device to study seed germination at different periods of time, to determine germination intensity or energy.

The biostimulant products used in our researches were the following: Green fuse. Stimupro. Agrostemin, Sea start, Super plant, Bionat, Mega grow.

The experimental device was consisted of 8 Petri boxes. Each box being divided into three sections (three repetitions). We have placed 100 alfalfa seeds into each repetition.

The experimental variants and the doses used were as follows: V₁ – Control (distilled water); V₂ - Green fuse (0.625 ml/l); V₃ – Stimupro (2.5 ml/l); V₄ – Agrostemin (1.875 ml/l); V₅ - Sea start (10 ml/l); V₆ - Super plant 1.25 ml/l; V₇ – Bionat (7.5 ml/l); V₈ - Mega grow (1.25 ml/l).

Readings were performed in 48. 72. 96. 120 hours after seed starting into germination.

The biological material was represented by alfalfa seeds (*Medicago sativa L.*). the variety Sigma

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3. Results and discussion

In order to make evident the influence of some biologically-active products upon the germination capacity of alfalfa seeds, we have founded, as presented in the methodology of work, an experimental device to study seed germination at different periods of time, to determine germination intensity or energy.

According to the results presented in table 1, we may conclude that the data recorded 48 hours after biostimulant application prove a significant differentiation of seed germination energy in alfalfa according to the product applied. In these terms compared with the control variant treated with distilled water. The Green fuse biostimulant generated the biggest seed germination capacity (38.38%). 12.67% more than in the control variant. Similar values were also achieved successive to the application of Stimupro, namely germination energy of 37.36%. The germination growths recorded in these two variants are statistically assured.

As a result of the application of other biostimulants (Super plant, Bionat, Mega grow), the germination energy became bigger with values of 33.3 – 39.3% than in the control variant. However, the application of other biostimulants (Agrostemin and Sea start) generated a decrease of about 2.5% of the germination energy, compared with the control variant.

In the case of the germination result recorded 72 hours after biostimulant application, the differences to the control variant are the same, although the germination values are smaller than of the ones recorded 48 hours after application (Table 2).

The germination data obtained in this time interval made evident some biostimulants that generated bigger growths than in the control variant: Agrostemin, with a growth of 2.16%, Stimupro with 4.70% and, respectively, Mega grow with

5.78%, in the case of this time interval, the biostimulants Sea start and Super plant negatively influenced seed germination in alfalfa. by generating values that are smaller than in the control variant.

The germination results obtained 96 hours after application show that the germination capacity increased in all variants, compared with the untreated control variant (Table 3). The germination differences, according to the product applied, are between 0.67 – 3.00%, representing a growth of 0.69 – 3.06%. Among these variants, we may remark the biostimulants Green fuse. Stimupro and Agrostemin; in these cases, alfalfa seed germination capacity attained the value of over 98%.

120 hours after biostimulant application, we may conclude that the substances applied play an important role in alfalfa seed germination capacity (Table 4), from this viewpoint, compared with the control variant whose germination capacity attained 95.67%, by applying biostimulants, the germination capacity became bigger than 98%. So, the biggest germination values, of over 99%, could be observed in the following products: Stimupro, Agrostemin, Mega grow and Super plant.

The synthetic analysis of the results regarding the influence exerted by biostimulants on alfalfa seed germination capacity shows that the biggest differences appear during the time interval 0-48 hours, when the biostimulants Green fuse and Stimupro exert the strongest influence of the germination energy. After this time interval at 72, 96 and respectively 120 hours, the differences between the germination capacities induced by biostimulants are relatively reduced. On the contrary, we could observe bigger differences between the untreated control variant and these biostimulants (Table 5)

Table 1. Biostimulant influence upon alfalfa seeds germination 48 hours after application

| Specification | Germinated seeds % | Differences (%) | Compared to control % | Significance |
|---------------|-----------------------|--------------------|--------------------------|--------------|
| Control | 33.00 | - | 100 | |
| Green fuse | 45.67 | 12.67 | 138.38 | * |
| Stimupro | 45.33 | 12.33 | 137.36 | * |
| Agrostemin | 32.00 | -1.00 | 96.96 | - |
| Sea start | 32.33 | -0.67 | 97.96 | - |
| Super plant | 33.33 | 0.33 | 101.0 | - |
| Bionat | 39.33 | 6.33 | 119.00 | - |
| Mega grow | 34.67 | 1.67 | 105.06 | - |

LSD 5% 9.56%; LSD1% 13.25%; LSD 0.1% 18.41%

Table 2. Biostimulant influence upon alfalfa seeds germination 72 hours after application

| Specification | Germinated seeds % | Differences (%) | Compared to control % | Significance |
|---------------|-----------------------|--------------------|--------------------------|--------------|
| Control | 92.33 | - | 100 | - |
| Green fuse | 93.00 | 0.67 | 100.72 | - |
| Stimupro | 96.67 | 4.33 | 104.70 | - |
| Agrostemin | 94.33 | 2.00 | 102.16 | - |
| Sea start | 91.33 | -1.00 | 98.91 | - |
| Super plant | 91.33 | -1.00 | 98.91 | - |
| Bionat | 93.00 | 0.67 | 100.72 | - |
| Mega grow | 97.67 | 5.33 | 105.78 | - |

DL 5% 7.83%; DL1% 10.86%; DL 0.1% 15.09%

Table 3. Biostimulant influence upon alfalfa seeds germination 96 hours after application

| Specification | Germinated seeds % | Differences (%) | Compared to control % | Significance |
|---------------|-----------------------|--------------------|--------------------------|--------------|
| Control | 95.33 | - | 100 | - |
| Green fuse | 98.00 | 2.67 | 102.80 | - |
| Stimupro | 98.00 | 2.67 | 102.80 | - |
| Agrostemin | 98.33 | 3.00 | 103.14 | - |
| Sea start | 97.33 | 2.00 | 102.09 | - |
| Super plant | 96.67 | 1.33 | 101.40 | - |
| Bionat | 96.00 | 0.67 | 100.70 | - |
| Mega grow | 97.67 | 2.33 | 102.45 | - |

LSD 5% 7.83%; LSD1% 10.86%; LSD 0.1% 15.09%

Table 4. Biostimulant influence upon alfalfa seeds germination 120 hours after application

| Specification | Germinated seeds % | Differences (%) | Compared to control % | Significance |
|---------------|-----------------------|--------------------|--------------------------|--------------|
| Control | 95.67 | - | 100 | |
| Green fuse | 98.33 | 2.67 | 102.78 | - |
| Stimupro | 99.33 | 3.67 | 103.82 | - |
| Agrostemin | 99.00 | 3.33 | 103.48 | - |
| Sea start | 98.33 | 2.67 | 102.78 | - |
| Super plant | 99.00 | 3.33 | 103.48 | - |
| Bionat | 98.33 | 2.67 | 102.78 | - |
| Mega grow | 99.33 | 3.67 | 103.82 | - |

LSD 5% 4.27%; LSD1% 5.92%; LSD 0.1% 8.22%

Table 5. Biostimulant influence upon alfalfa germination (% final result)

| Specification | 48 hours | 72 hours | 96 hours | 120 hours |
|---------------|----------|----------|----------|-----------|
| Control | 33 | 92.33 | 95.33 | 95.66 |
| Green fuse | 45.66 | 93 | 98 | 98.33 |
| Stimupro | 45.33 | 96.66 | 98 | 99.33 |
| Agrostemin | 32 | 94.33 | 98.33 | 99 |
| Sea start | 32.33 | 91.33 | 97.33 | 98.33 |
| Super plant | 33.66 | 91.33 | 96.33 | 98.66 |
| Bionat | 39.33 | 93 | 96.33 | 98.33 |
| Mega grow | 34.66 | 95.66 | 97.66 | 99.33 |

4. Conclusions

The synthetic analysis of the results regarding the influence exerted by biostimulants on alfalfa seed germination capacity shows that the biggest differences appear during the time interval 0-48 hours, when the biostimulants Green fuse and Stimupro exert the strongest influence of the germination energy, after this time interval, at 72. 96 and respectively 120 hours, the differences between the germination capacities induced by biostimulants are relatively reduced. On the contrary, we could observe bigger differences between the untreated control variant and these biostimulants.

Successive to biostimulant application, the alfalfa seed germination capacity increases, compared with the control variant, with up to 3.82%.

References

1. Bopp. M., Plant Growth Substances, Springer Verlag, Berlin, Heidelberg, New York. Tokyo, 1986.
2. Chory J., Chatterjee M., Cook RK. Elich T.. Fankhauser C.: From seed germination to flowering. lights controls plant development via the pigment phytochrome. Proc. Natl. Acad. Sci. USA 93: 12066-71. 1996.
3. Gergen I., Lăzureanu A., Goian M., Borza I., Pușcă I., Vâlceanu R.: Utilizarea bioregulatorilor în producția vegetală. Ed. Facla. Timișoara, 1988.