

HIGH VOLTAGE ELECTROSTATIC FIELD (HVEF) ON THE EFFECTS OF SEED GERMINATION

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Abstract: Seed is an important organ in order to maintain the sustainability of the plant species and varieties. Ability of seed germination is important and preferred to be tough. And increasing the percentage of germination as well as the effect of environmental conditions in different applications extend the endurance time the effect is concerned. One is a high voltage electrostatic field application. Successful results in terms of the extension of the duration and strength as well as the germination percentage were obtained with this application. It is also an alternative protection against malicious applications using substances of this embodiment may be also considered. Studies in this context have been found to be mostly positive results. What this study, the next step is to compile the work done on the effects of high voltage electrostatic field germination applications developed recommendations are made.

Keywords: STATIC ELECTRIC, FIELD, SEED, GERMINATION

1. Introduction

Seed directly limit the reach of efficiency in crop production, the productivity levels of all other inputs used in the production process is an extremely important agricultural inputs affecting indirectly. In agriculture, all the conditions for plant growth at the appropriate level, although sufficient to achieve product depends on the quality of seeds used. All other inputs used in aquaculture production plants helps to perform only the seed production capacity. Seed production capacity and other features are in effect limiting crop production. Fertilizers, drugs, and chemicals and other production factors such as hormones only helps to realize the capabilities of the seed.

To become an economic activity and the industry with being the first agricultural inputs used in the agricultural seed is fairly new. Seed quality testing in the world and work in seed technology field began in the middle of the last century. Of the crops produced in the world is produced by means of seed portion close to about 90% (Tulukcu, 2012).

2. Materials and Methods

The first stage in plant breeding and seed planting is grassed. To begin germination of the seed and the continuation of different plant species and varieties of the major environmental factor varies according to the specific requirements (water temperature, oxygen and light) to have the desired level is also important. Due to various factors arising from the seed of the internal and external structure after the October to avoid negative effects such as delay or germination germination and seedling emergence can be bold faced.

When the value of said physical quantity of pure seed Seed 1000 the amount of live and inert matter contained in the seed weight and they understood each other ratios. A good seed is the seed that is 97% pure. Another 1000-grain weight ratio physical purity of the seed value is also important. That the seeds of the coarse-grained and homogenous size helps in driving growth and equal time for all of them. At the same time the seedling root and isozymes and root tip focuses on criteria such as cell division.

A study to investigate the effect of electric fields on the germination of barley seeds, protecting the viability of the seeds of its methods have been shown to have a positive impact.

The experimental data were found to be significantly increased with the electric field direction between the influence of the electric field is processed statistically. At the same time, there are significant differences in terms of viability and germination were determined. The energy content of the transmitted seed and seed of the electric field strength is indicated to be dependent on the electrical properties (Lynikiene, 2003).

fell to the same depth if necessary moisture and nutrients can take in equal proportions.

When called to understand the biological value of seeds seed germination rate and power. 100 seeds for the calculation of the seed germination rate and power on the 3-5 cm soil covering grass beds; Who counted 3-4 days after germination. This is performed as a number of sampling. Things that the average of the sample taken. This average germination rate in%, while the average of the counts made 7-8 days after germination gives the power.

Genetic characteristics as the following economical seed in the foreground.

- High efficiency
- Earliness
- Winter and drought resistance
- Disease and pest resistance

2.1. HVEF Applications

Recent research suggests that the effects on the biological phenomena of the natural electric field. High intensity of the electric field accelerating the development of various plants seems to be possible.

Many researchers in recent years to create high-quality production and improve unsatisfactory aspects of the kind of material they use HVEF both alone along with other physical and chemical factors. Live on the environment in which they live as natural as well as their magnetic fields are also under the influence of a magnetic field. The HVEF in studies conducted to date have been shown to have positive or negative effects on various plant characters.

High voltage electrostatic field (HVEF) is a type of man-made magnetic fields. This energy is absorbed by the plants, the seeds and plant growth has been demonstrated by several studies that make a positive contribution. For this purpose the protection of seed viability studies with HVEF old seed is made. This type of seed viability studies, physiological indexes, soluble proteins,

Alternating current (AC) electric and magnetic fields in a study on tomato seed germination of tomato seeds by applying were exposed AC AC electric field and magnetic field at different concentrations. Compared with the direction of the electric field seed germination rate of seeds subjected to the application so that the tomatoes grown in normal conditions of seed germination rate was found to be about 1.1-2.8 times more. The experimental apparatus is given in Figure 1 (Moon, 2000).

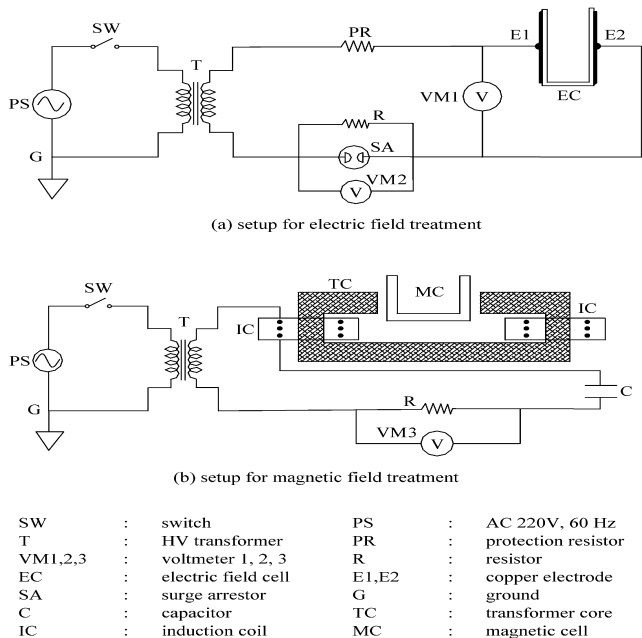


Fig.1 Experimental setup

Stable different magnetic field strengths in studies on the effects on seeds germination and precocity of the corn seeds were exposed to a magnetic field and the different time intervals at 125-250 m. The plants in the magnetic field was found to be superior to the control product (Florez, 2007).

An alternative could be the use of chemical pesticides in the direction of the effect electrical field of view are available. Plant seeds are indicated the efficacy of the various prevention of diseases transmitted from your application or in terms of electric field treatment.

2 to 16 kV / cm between voltage under varying between 1-30 seconds has been found to be more severe than those untreated by weight of bean seeds subjected to 50 Hz electric field. Seed processing unit 75 kV and 50 Hz test rig consists of a plate-type capacitors have the characteristic generator is used. The experimental setup used is given schematically in figure 2 (Moran, 1999).

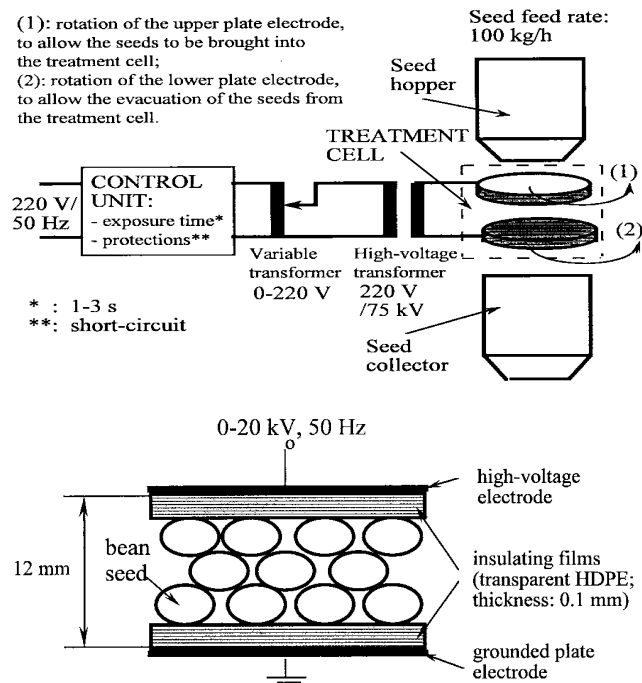


Fig.2 AC electric field production facilities have been tried Beans

Negative electrostatic field studies on the effects of the application of the trees on the germination of seeds of forest trees extinct with the germination of seeds and emphasized the wooded area can be utilized for redevelopment. Such studies performed on seed germination and seedling growth of static electric field (electrostatic field) is proposed which makes different effects. A study of the germination of pine seeds in a similar positive effect was observed in the study of the electrostatic field treatment on pine seeds -500 kV / m showed no improvement in germination percentage of 10 minutes when voltage is applied. Gibberellic acid on the results obtained in the same study (GA3) in moistened seedlings with 100 ppm was shown to reduce the negative electrostatic charge and seedling growth are shown schematically in Figure 3 (Piras, 2013).

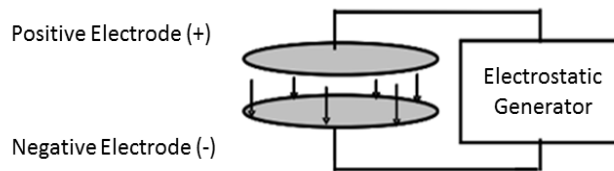


Fig.3 Seed treatment principle

3.Results

High-voltage electrostatic field (HVEF) made application on seed germination studies with stands was more a result of the positive effects of the application. On the practical side to increase the germination rate of the seeds of plants that effect is revealed by researchers.

In studies to be done in this area, especially to increase the value of seed germination is the main factor in the growth of plants, seeds are expected to be taken step in the protection against pests and diseases. The use of chemicals can be said instead HVEF space provided in important contributions to environmental protection.

4.References

Florez, M., Carbonell, MV., and Martinez, E., 2005. Exposure of Maize Seeds to Stationary Magnetic Fields: Effects on Germination and Early Growth. Environmental and Experimental Botany 59 (2007) 68-75.

Lynikiene, S. and Pozeliene, A., 2003. Effect of Electrical Field on Barley Seed Germination Stimulation. Agricultural Engineering International: the CIGR Journal of Scientific Research and Development. Manuscript FP 03 007.

Moon, JD., and Chung, HS., 2000. Acceleration of Germination of Tomato Seed By Applying AC Electric and Magnetic Fields. Journal of Electrostatics 48 (2000) 103-114.

Morar, R., Munteanu, R., Simion, E., Munteanu, I., and Dascalescu, L., 1999. Electrostatic Treatment of Bean Seeds. IEEE Transactions ON Industry Applications, vol. 35, no:1.

Piras, A., Gui, Z., Qiao, L., Gui, K., and Fan, Y., 2013. Effect of Negative Electrostatic Field Treatment on Germination of Seeds Soaked GA3. International Journal of Soft Computing and Engineering (IJSCE) ISSN: 2231-2307, Volume-3, Issue-3.

Tulukcu, E., 2012. Bazı Tıbbi Bitki Tohumlarının Çimlenme Özelliklerinin Tespiti. Tarım Bilimleri Araştırma Dergisi 5 (1): 101-103.