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Review article

Combination of air ionization and engineering physics methods for optimization agroindustry

A. Jahanshir

Department of Physics, Bueinzahra Technical University, Ghazvin, 3451745346, Iran.

*Corresponding author; Department of Physics, Bueinzahra Technical University, Ghazvin, 3451745346, Iran.

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ABSTRACT

Air/water ionization technology (AIT) in the greenhouse farms is one of the offering methods of increasing healthy crops and much more productions as usual methods in agricultural industry. AIT is a hi-tech equipment for improving farms productions beside of growing plants process. This technology has more important in improvement of plants living conditions in greenhouses. According to the performed research, utilizing the agricultural modern technologies, have an efficient effect on the quantity and quality of greenhouses and farms products. For this reason, negative ion injections into the greenhouse farms could be a part of research policies in developing and least developing countries for effective exploitation and correction of agricultural conditions, as it was the part of basic researches policies in last 40 years in developed countries. In this paper, we try to introduce hi-tech air ionization equipment based on corona discharge method and expression of its importance using in developing and least developing countries.

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1. Introduction

Leading today's processes in order to increasing agricultural products is one of the goals of modern policy and macro industrial management in developing and least developing countries. Due to this point, the main challenges for capabilities of using hi-tech equipment, have closely related to agricultural science and technology

management theories. Looking deep in technology management procedures in the developed and developing countries and compared them, it is clearly showed that we can see substantial differences in the path of agricultural management in the developed countries. The basic frame of agricultural industry management strategies in developing countries, based on old methods which we could not see the modern scientific and technological based methods. In the first step, we have to set some new management methods which evaluate and analyze the hi-tech technology and modern equipment in the world that directly increase the crop products. In the second step, we should try to study knowledge gains and technologies management. In other words, we have to assume and take up theories, practical approaches and new variety of strategies in the field of "agricultural industry management". Therefore, negative air ionization technology (NAIT) has been around a long time, but got the attention of the agricultural industries about 40 years ago in developed countries (Chizhevsky, 1934; 1959). NAIT generally work by applying a high voltage electric current to a metal needle. It works by continuously emitting a high concentration of negatively charged ions into the air or environmental air of greenhouse farms. The ions transfer their charge to airborne particles, which are then indirectly or directly affected on plants. As we know the ions are dispersed into the air from electrical discharge process named corona discharge. The original version of high tech equipment of air ionization featured a wire suspended at high voltage potential with direct current. Its major advantage is the ability to change the ions concentration in the air and therefore it can provide a higher concentration and balance level of charged particles in the air. Hence, the artificial application of air ionization has found special position in different branches of agriculture science (Jahanshir, 2014). So utilization of Using NAIT equipment in agriculture and cultivation section in Iran is considered a necessary matter that we write about this equipment in current article.

2. Agricultural modern management based on high-tech engineering

Agriculture is the most important sector in developed and developing countries. One of the important constraints to increase productivity is modern technology and equipment. In this article we study the Ionization Equipment that directly can increase the volume of productions. The use of Ionization equipment could also make better production as usual agricultural methods. Finally, modern agricultural Ionization equipment (Air Ionization or water Ionization) can dramatically reduce crop production losses and efficiently reduce the pests, and diseases [4]. The adoption of modern technology such as "ionization equipment" is a new technique that boosts crop yields and reduces waste by using negative ion spraying into the air of greenhouse farms. This method is using in the 21st century in the some countries as Russia and CIS. It is technology that is accessible to all farmers, not just those in the greenhouses. By utilizing proven modern Negative Ionization Techniques and science-based solutions, which are readily available in developed countries, farmers can increase efficiency, productivity, and profitability as well as reduce enhance food security and malnutrition. These techniques also can be useful for farmer (Townsend, 1915). Even for small land holders the increasing volume of production means that they can be more success in economy and it directly related to the macro economy and macro industrial development. Negative ion molecules in the air and water can be useful to increase efficiently of Photosynthesis. The air ionization with hi-tech equipment (high voltage supply and large amount of electrodes) is electro-physical process. By this method the natural small ecosystems of greenhouse farms with air ionization will have the better air components and circulation. One of the greatest challenges facing developing and least developing countries is how to manage natural resources for a healthy and much more crops. For over 30 years scientists researched the effects of electromagnetically fields on plants and a method of electro-magneto dynamical activation of air and water in the greenhouse farms. From these researches exciting new applications have been developed and tested in Russia and some of Middle East countries. The applications include chemical changes of air/water parameters, resulting in improvement of its properties. Research shows that these changes result in an increased ability of air/water to get healthy and much more crops. The plants of greenhouse farms ionized with high voltage electrodes easily take up negative ion molecules from the air/water grow more quickly as usual. The processes by any factor that increase and concentrate the electrical field in the vicinity of conductive material and *ionized ambient* air is called electrical discharge. According to outward signs, shape and kind of chosen electrodes, the electrical discharge are distinguished under the names of corona, electrical arc, etc. In this project, the corona discharge process is considered appropriate in order to produce anion in high volume and high concentration. During electrical corona discharge in ionization chamber, particles behavior look like the fourth state of matter i.e., plasma. The structure of free electrons, atoms and ionized molecules, in the scale of neutral macroscopic with interactions between each

other is called plasma. According to these subjects, in compressible fluids, semi- electron particles that have initial energy and high speed during their collisions with a neutral atom or molecule, the energy is transferred into that atom or molecule. So the collided electron converts it into the ion, if the achieved energy has the enough power to separate an electron from a neutral atom, otherwise the ion producing in multiple stages of collision should take place if the colliding particles get the energy from the field. For example, by ionizing the environment, we can create the negative oxygen molecule which is very necessary in photosynthesis and plants respiration, so by this method, the optimized greenhouse management is becoming possible. According to the above mentioned topics, in order to improve growth in plants and productivity of plants, using the controlled electrical corona discharge, the capability of direct influence on the air inside greenhouse farms is being obtained. During air ionization by corona discharge, it will produce a large *number* of anion, so the most important and effective physical quantities in this ambience around electrodes are the Coulomb force and electric field intensity (Happ et al., 1966). This is method for increasing the crop products in greenhouse farms by using corona discharge equipment which guided by modern management in agricultural industry.

3. Conclusion

In the developed countries, all process extreme to be more efficiently by using scientific based knowledge and excellent hi-tech management. So the some reasons of slowly climb path in agricultural industry process in developing and least developing countries, related to the defect of using modern and hi-tech equipment. One of these technologies is NAIT. In the NAIT equipment air molecules after ionization we can have influence photosynthesis process and it causes growth of plants or changes and corrects growth conditions in the greenhouse farms. The negative ion molecules especially oxygen, will provide a healthy environment for plants growth process. Using NAIT in greenhouses, anions have the ability to conquest the microbes and reduce the pest crops disease in the gardens (Happ et al., 1966). Therefore we should to introduce our farmers and agricultural company with this method, which help developing and least developing countries to manage agricultural industry issues and lead the sustainable development.

References

- Chizhevsky, A.L., 1934. Deposition of Microorganisms Indoor Air Using Aero-ionization in the Electric Field. Russ. med. Newspaper., №18.
- Chizhevsky, A.L., 1959. Guidance on the Application of Ionized Air in Industry, Agriculture and Medicine. Gosplan. Publ., Moscow, p. 228.
- Happ, J.W., Harstad, B., 1966. Effect of Air Ions on Submicron T1 Bacteriophage Aerosols. Appl. Microb. J., pp. 888-981. vol.14.
- Jahanshir, A., 2013. Artificial Ionization of the Air in the Greenhouse and Agricultural Fields. Proceed. Nat. Electron. Confer. Innovat. Hort. Sci., Jahrom University, Shiraz, Iran.
- Jahanshir, A., 2014. The role of modern technologies in improvement of increasing the greenhouse-farms crops products. J.Middle East Appl. Sci. Technol., pp. 191-194, vol, 7(6).
- Townsend, J.S., 1915. Electricity in gases. Oxford Univ. Press.