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Review

Foliar Fertilizer and Alfalfa Culture

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Abstract

They have the main purpose of supplementing the quantities of chemical elements and nutrients necessary for the development of plants, which they take over through the aerial bodies not through the root. The degree of absorption is in many cases approaching 100%. In the chemical composition of quality foliar fertilizers, many microelements play an essential role in plant nutrition, especially when it is desired to obtain large and qualitative productions. Increasing efficiency can also reduce the amount of fertilizer applied to the soil, reducing the rate of washing and the loss of fertilizer. Some of the latest research shows the qualitative and quantitative increase in production by increasing N and P absorption, and making phosphate ion available to the cell at the time the plant needs it.

Keywords: *plants, leaves, nitrogen, phosphorus*

1. Introduction

Foliar fertilizers are chemicals applied by spraying them on plants. It is mainly used in field crops, orchards, vineyards or vegetable crops.

They have the main purpose of supplementing the quantities of chemical elements and nutrients necessary for the development of plants, which they take over through the aerial bodies not through the root. For the absorption through the root it is assumed that the application of the fertilizer will take place for a longer time and that it will be used by the plant. In the case of foliar fertilizers, they are absorbed directly, completely and easily by the leaves, and a rapid transfer of the component elements into the tissue of the plant is achieved. In this way, in a few hours the function of the product applied to the plant is made [1-5].

The degree of absorption in the use of quality foliar fertilizers approaches almost 100%. Complex composite foliar fertilizers contain a multitude of nutrients and have a greater effect on plant growth, quantity and quality of production.

A well defined role of this product type is due to plant deficiencies or the prevention of these deficiencies to different types of crops.

In these cases, anticariant foliar fertilizers with different composition depending on the deficiency are used. There are iron, calcium, copper, zinc, magnesium, manganese, etc. products. or combinations thereof [1-5].

2. Foliar fertilizers

Foliar fertilizers can be applied to ensure the correction of nutrient deficiencies of plants and can solve this problem in a short time, due to climate,

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technological or soil deficiencies. The absorption of nutrients by plants is quick and complete.

The degree of absorption is in many cases approaching 100%. In the chemical composition of quality foliar fertilizers, many microelements play an essential role in plant nutrition, especially when it is desired to obtain large and qualitative productions. These essential trace elements are not usually found in sufficient quantities in soil or in most of the chemical fertilizers used.

Foliar fertilizers can be successfully used both in field crops and in orchards, in vines or in vegetable crops. The use of these products helps to achieve higher yields and has a major contribution to the quality of the obtained products, which farmers in the fruit and vegetable sector are very interested in [1-5].

3. Use and benefits of foliar fertilizers

Due to the quality of the materials used and the manufacturing technology, foliar fertilizers have the advantage of being non-toxic, non-polluting, corrosive, easy to handle and practical. Furthermore, the danger of leaching or diminishing their effect disappears.

Farmers should be careful to use safe, high quality products and provided by well-known firms. Unfortunately, there are many companies selling low quality products on the market, which contain cheap ingredients, low concentrations of nutrients or even chemicals that are not recommended for plants.

It is advisable to apply these products in combination with plant protection products to reduce the number of spraying operations.

Foliar fertilization is any fertilizer applied on leaves in liquid form. This is a time consuming, sometimes important, and usually for a small amount of nutrients [1-5].

In contrast to this, modern foliar fertilizers are concentrated solutions that use high purity technical elements and where nitrogen, phosphorus and potassium (considering only some of the elements) are combined in a desired balance, in a controlled environment.

The fertilizing elements in this situation are in solution, soluble, and thus very accessible to plants. This is in contrast to the application of fertilizers on the ground (in the form of solids), which are usually applied in granular, dried form.

They must then be dissolved either by irrigation or watering in the rain, to be available to plants through the root system. In other words, they must be dissolved in the soil solution to be accessible to plants.

In foliar fertilizer solutions, it is also possible to add microelements in the form of chelata (organo-mineral compounds), humic acids, or other additives depending on what is desired to obtain a balanced fertilizer that ensures not only the NPK , but also all the microelements, as well as growth and development hormones, vitamins, etc.

Se pot realiza foarte multe combinatii NPK, diferite in functie de cerintele aplicarii. Elementele care constituie fertilizantul foliar sunt cele care sunt necesare cresterii si dezvoltarii plantelor si sunt astfel formulate pentru a satisface pe cat posibil acest necesar [1-5].

For plant growth and development, 16 elements are considered essential.

These essential elements are divided into two groups: macronutrients, required in large quantities such as C, H, O, N, P, K, Ca, Mg and S, and micronutrients required in small quantities, including Fe, Cl , Mn, B, Zn, Cu and Mo. By far the highest proportion - 96%, is represented by H, C and O and which are freely taken from the air and water. All other elements are found in the 4% difference, of which the major elements N, P, K, Ca and Mg represent 3.4%, remaining only 0.6% for microelements.

As for the consumption of plant elements, it is sometimes very high. Thus, especially in the case of vegetables and especially those grown in a protected system, the consumption of major elements is particularly high, as well as of the obtained productions.

Depending on the need for application, foliar fertilizers can be formulated to meet crop-specific requirements. For example, when the plant requirement is high in nitrogen, a high concentration foliar fertilizer is formulated in this element compared to phosphorus, but the formulation changes in the case of plant growth phenophases when the requirement for phosphorus and / or potassium is higher compared to nitrogen.

This situation occurs frequently when plants change the stage of growth with the growth stage, the vegetative one with the generative, or when they are usually subjected to stress factors. Since 1953 at Michigan State University, the United States Department of Atomic Energy has developed a study of the foliar absorption of nutrients as well as their translocation into plants.

Fertilizers marked with radioactive isotopes have found out how much fertilizer is taken by the plant and how much it is lost. It's about the efficiency of using them.

It is very important that as much of the fertilizer is found in the plant and as little as possible to be lost in the environment [1-5].

Radioisotopes have shown that all the nutrients applied to the foliage are absorbed by the leaves.

They are even absorbed through the woody tissue of the trees (through the bark). In fact, these isotopes have shown that it is 8-10 times more effective to feed a plant than the quantity of nutrients required and the rate at which they are used.

The beneficial effects of a leaf are due to an increase in cellular chlorophyll synthesis. This growth of chlorophyll and cellular activity and respiration can be seen as a first sign in crops after application of foliar fertilizer by passing the color of the leaves into a dark green.

The phenomenon can be measured refractometrically in at least 4 hours. Increasing cellular activity and breathing brings an increase in water absorption through the vascular system in response to the increase in leaf water requirement (this automatically brings more fertilizing elements into the plant through the vascular system).

Application of foliar fertilizers does not mean that soil fertilization is replaced but increases their absorption. Increasing efficiency can also reduce the amount of fertilizer applied to the soil, reducing the rate of washing and the loss of fertilizer. Some of the latest research shows the qualitative and quantitative increase in production by increasing N and P absorption, and making phosphate ion available to the cell at the time the plant needs it.

A small amount of potassium and phosphorus can significantly increase production, bringing more money compared to ground fertilization [1-5].

The greater need for water and more gas exchange stimulates the growth of root mass to provide them.

The excess of carbohydrates produced by plants, due to greater sugar synthesis by increasing the synthesis of chlorophyll, is returned to the root through the root canals that will further stimulate microbial colonies around the root as additional sources of energy. Instead, bacterial colonies will produce auxins and other root-system stimulation compounds.

More root tissue and more radish roots increase the plant's ability to absorb water and nutrient ions.

It is a chain reaction if the necessary fertilizer is applied at the time necessary to achieve this cycle. With foliar fertilizers, there is greater efficiency because we stimulate the entire pumping system that includes leaf cells [1-5].

The important thing we should not forget is that through a small amount of foliar fertilizer used, actually increases the absorption compared to the total absorption, several times the amount of applied fertilizer.

Some researchers suggest a 6: 1 ratio.

Foliar applications often coincide with specific vegetative or fructic development stages, and the fertilization formula must be adjusted accordingly. Applications can also be made to help plants recover from planting shocks, hail damage, or other extreme environmental factors.

In terms of nutritional absorption, foliar fertilization can be 8 to 20 times more effective than applying fertilizer to the soil [1-5].

4. Conclusions

The efficiency of foliar fertilization is not always attained in practice. Often the lack of efficiency is the result of the lack of attention paid to the principles of foliar nutrition.

Other causes of failure include the application of a wrong mix or a good mix at an inappropriate time.

The judgment, what foliar fertilizers to use and in which the phenophase to apply, seems to be as much an art as so much a science.

While foliar fertilization is used in a wide variety of crops, its economic value is generally appreciated to be higher in horticulture than in large crops. This is because horticultural crops have a higher value and their nutritional status is more closely monitored.

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