# THE IMPORTANCE OF MAGNESIUM IN COCONUT NUTRITION

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agnesium, as the only mineral element that goes the constitution of Chlorophyll, plays an impor- ole in photosynthesis, the main food producing ess of green plants. It has been established that element comprises about 2.5 per cent of the chlo- yll molecule, representing approximately 10 per of the total leaf magnesium. The requirement of nesium to the plants are, however, by no means ed to the quantities used in the formation of chlo- yll. Magnesium participates in various other vital esses of plants. This is easily shown by the fact plants which are not green including the most itive bacteria require magnesium in order to sus- ife. Studies of enzyme systems from plant and al tissues indicate that magnesium plays a pre- inant role in the activity of various enzymes con- ed with carbohydrate metabolism. In recent years s become increasingly clear that magnesium par- ates intimately in the group transfer of elements erving as an intermediate carrier. It is well esta- ed that magnesium acts as a carrier of phospho- in plant metabolism. Relatively high concentra- of magnesium in plant tissue has been found to ssociated with rapid growth of young cells, active division and high protein concentration.

as Leibig who first discovered magnesium to be gular constituent of the plant. Since then, nume- investigations have been carried out to study the of this element on plant growth and producti- Results obtained from these investigations have ly established the importance, the magnesium as an tial plant food. However, the inclusion of mag- m in the fertilizer programme of crop plants has been neglected. This was because of the striking nse of crop plants to potash fertilizers which, in ast, contained sufficient quantities of magnesium. cent times, however, the supply of highly refined potash fertilizers with little admixture of magnesium has brought forward the necessity of supplementing the soil with adequate quantities of magnesium.

That the application of magnesia fertilizers could enhance crop yield, has been amply proved from experiments conducted in different parts of the world. Mention may be made of the work of Dr. Schrider, a German Scientist, who studied the effect of magnesium fertilizers alone and also in combination with potash fertilizers on Wheat, Rye, Barley and Oats. He found that only the combined application of Potassium and magnesium produced higher weights of grain and increased straw yield. Potassium and magnesium given alone had only depressing effect on the yield. Field experiments conducted by the agricultural section of the German Potash Syndicate in various parts of Germany have shown that the application of magnesium sulphate at half the dose of potassium sulphate resulted in an increase of potato yield by 600 kg. per acre. Maize yields also reacted most favourably to potash fertilizers containing magnesia. Apple trees gave increased yields when sprayed with 2 per cent magnesium sulphate solution on the foliage. These examples are sufficient to prove that magnesium fertilization can by no means be considered a matter of secondary importance but it is rather an absolute necessity which, on no account be neglected.

Since magnesium is a constituent of chlorophyll molecule the most common symptom of magnesium deficiency in green plants is extensive intervenal chlorosis of leaves. Yellowing is practically always more severe or first seen in the basal older leaves and eventually reaches the younger leaves. The base to tip order of appearance of deficiency symptoms indicate that magnesium like nitrogen and phosphorus, is mobile in plants.

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Recent investigations carried out particularly on perennial crops in Soviet Union and America tend to show that the symptoms of magnesium deficiency may also occur in soils which cannot be classified as magnesium deficient. These symptoms can be observed especially after the application of intensive dressing of potash for longer periods. It has, for instance, been found that fruit trees did not show any symptoms of magnesium deficiency after the application of badly balanced fertilizers consisting of nitrogen and phosphoric acid. When potash was additionally supplied the leaves began to show typical symptoms of magnesium deficiency. This is known as 'potassium induced magnesium deficiency'. This phenomenon is probably caused by a reduction in the capacity of plants to absorb the rather less readily soluble magnesium from the soils due to the large supply of more readly soluble potash. Results of a series of tests showed that magnesium deficiencies which are already present are increased by supplementary application of potash fertilizers. It is well established that a plant will, by preference, absorb the more soluble cation from a solution in the soil. In the present case it is the potash ion that reduces the mobility of the magnesium ion, thus impeding the absorption of magnesium. It is, therefore, highly essential to apply adequate amount *of magnesium to the soil in order to fully benefit from* potash fertilization.

Coconut has been christened as a potash-loving plant and, continued application of potassic manures to step up yield tends to induce magnesium deficiency in the soil. Magnesium deficiency leading to decrease in yield could be expected under three sets of conditions, viz (a) continued application of highly refined potash fertilizers along with ammonium and calcium salts, (b) acidity of the soil and (c) leaching. Research workers in Sri Lanka have reported that the acid leached laterite soils receiving regular dosages of inorganic refined NPK fertilizers present optimum conditions for magnesium deficiency. It is pertinent to note in this connection that all these conditions are prevalent in the coconut growing tracts of Kerala which account for 70 per cent of the total production of coconut in our country.

Only in very recent times research workers in coconut have fully realised the importance of magnesium in coconut nutrition. A number of experiments have been carried out in different parts of the world to study the role of magnesium in the growth and yield of coconut palm. Results obtained so far have been quite encouraging. A long term field experiment conducted at Central Plantation Crops Research Institute, Regional Station, Kayamkulam to study the effect of magnesium and certain micronutrients on the growth and productivity of the coconut palm has shown that the palms which received magnesium gave significantly higher yield than those which received no magnesium. Another experiment recently concluded at the same station has shown that magnesium application increased the yield from 49 to 62 nuts per palm per year. Similar results have also been reported from Sri Lanka and Ivory Coast. Foliar yellowing is a common phenomenon met with in coconut gardens. Yellowing is very often found associated with root (wilt) disease and is restricted to the outer whorls of leaves in most cases. Leaf analysis clearly indicated that an imbalance in the Potassium/Magnesium ratio resulting from magnesium deficiency caused this type of yellowing. Foliar application of 2 per cent magnesium sulphate solution, at quarterly intervals, was proved to be very effective in controlling this type of yellowing in coconut. Mineral nutrition experiments recently carried out at Port Bouet in Ivory Coast have shown that hybrid coconut seedlings *responded remarkably to magnesium fertilization. Appli*cation of a balanced fertilizer containing nitrogen, potash and magnesium, right from the time of planting helped to promote vegetative growth and induce early flowering in coconut seedlings.

These experimental evidences clearly suggest the necessity of magnesium as an essential nutrient for coconut. However, very little attempt has been made to bring this aspect to the notice of the cultivators. Coconut growers, at large, are still adopting the conventional method of fertilization, which includes only NPK and certain organic fertilizers. To achieve full benefit from NPK fertilization, adequate amount of magnesium should necessarily be added to the soil. Investigations are under way to standardise the quantitative aspects of magnesium amendments. The present recommendation is 500 grams of magnesium sulphate per tree per year or alternately 2.0 kg of dolomite, which contains calcium also.