POTASSIUM, CALCIUM, AND MAGNESIUM IN THE TROPICS AND SUBTROPICS pdf

1: Potassium deficiency

The potential for increased food production in the world is undoubtedly greater than even the most optimistic surveys predict. Proper use of adequate amounts of potassium, calcium, and magnesium.

This plant is mainly grown in warm temperature, subtropical and tropical regions. This is a nutrient â€" dense, fat â€" free and low â€" calorie food which can be added to any diet. Fresh, immature okra pods and its leaves can be used in different cuisines as vegetable. You can enjoy okra in pickled, boiled or fried form. Okra seeds are pressed to make greenish â€" yellow and edible okra which has a pleasant odor and taste. This oil is rich in unsaturated fats such as linolenic and oleic acid. Also okra is rich in potassium, calcium, folate content, Vitamin K and Vitamin C. Also it has lutein, beta â€" carotene, manganese, magnesium, Vitamin B6, thiamine and niacin. Health benefits of okra Makes your hair soft and shiny: Okra has vitamins and antioxidants which can help you to enjoy bouncy, shiny and well â€" conditioned hair. Also it has other useful nutrients such as thiamine, folate, potassium, zinc and copper which are good for your hair. Okra has transparent mucilage which works as a natural conditioner and it gives life to the dull hair. This vegetable helps to cleanse your liver and also it can prevent liver disease. It has substances that bind bile acid and cholesterol to detoxify your liver. Also this vegetable can prevent accumulation of fats in your liver. There was one study in which was concluded that the potent antioxidant property of okra extract has the ability to protect against chemically induced liver damage. If you want to improve your liver health and it prevent the disease, then you should include okra in your diet or you can take okra supplements after you have talked with your doctor. Promotes a healthy pregnancy: This vegetable is highly recommended for pregnant women. It has B vitamins that will ensure healthy growth of the baby in the womb and also it will prevent birth defects such as spinal bifida. Also it is rich in folic acid which aids in producing and maintaining new cells which is important for healthy pregnancy. Folate can also prevent miscarriage. Okra has Vitamin C which plays an important role in fetal development. If you are pregnant, then you should include okra in your diet, especially during 4th and 12th weeks because in these weeks the neural tube develops in your fetus. Medicinal value of okra Treats leucorrhea: In the traditional folkloric practice, the fresh tender okra pods were effective natural treatment in treating leucorrhea which is causing yellowish or whitish vaginal discharge between menstruations. Okra has mucilaginous property which will remove mucous from your system which in turn will reduce the vaginal discharge. Also it can boost your immune system which will fight against this problem. This vegetable can help you to lower your cholesterol levels. There was one study in which is said that the hypolipidemic activity of okra skin extract will provide cholesterol â€" lowering benefits. Also it inhibits pancreatic cholesterol esterase activity which is reducing the efficacy of cholesterol micellization and also it binds to bile acids which in turn increase the cholesterol excretion and delays cholesterol absorption. Okra has not saturated fats or cholesterol. It can help to prevent heart disease or other health problems which are caused by cholesterol in our blood. You should include okra in your diet because it can lower the bad cholesterol level. Also you can take okra extract but firstly you need to talk with your doctor. Reduces blood sugar levels: This vegetable has insulin â€" like properties that will reduce the blood sugar levels. Also it has low glycemic index of about twenty which is making it one of the best foods for people who have diabetes. There was one study in which is confirmed that okra has antihyperlipidemic and antidiabetic potential of its peel abelmoschus esculentus and seed powder in diabetic rats. Also there was another study in which is said that okra can help to reduce the absorption of glucose which in turn will lower the blood sugar levels.

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Characteristics and occurrence Root crops have a high requirement for potassium K compared with cereals, as the content of potassium in the harvested roots is high. Even soils which are naturally high in potassium may become depleted after several successive crops. In contrast to nitrogen or phosphorus deficiencies, potassium deficiency tends to have a much greater effect on storage root yield than on the growth of the tops. Therefore, correction of an apparently mild deficiency may result in large yield increases. Symptoms As with other major nutrients, potassium deficiency can cause substantial growth reduction before specific symptoms develop. In the field, symptoms often develop after two to three months, when the expanding storage roots begin to place increased demand on potassium supplies. Yellowing appears on the oldest leaves, while the youngest leaves retain a normal colour, size and texture. If young leaves are normally purple, this pigmentation may be reduced in K deficient plants. On the oldest leaves, yellowing occurs in marginal and interveinal zones. Brown necrotic lesions develop within the yellow parts and eventually spread to cover the entire leaf blade. Cultivars vary in the pattern in which lesions spread. In some, spreading is predominantly from the margins to interveinal zones, in others lesions are initiated in interveinal regions nearer the midrib, and some may spread with relatively little regard for veinal distribution. Necrosis associated with K deficiency is usually dark in colour, and the necrotic areas become dry and brittle. The yellowing and necrosis may be preceded by a light green interveinal mottle affecting mature to older leaves, and often most obvious on the leaves of axillary shoots. This may be the earliest, or only sign of potassium deficiency, but depending on cultivar and conditions, it may not develop. Initially, leaves of intermediate age may be more affected than the older leaves. Minor veins retain their green colour, dividing the pale tissue into small areas. In some cases, the interveinal tissue may become necrotic, either remaining as isolated spots or coalescing to form small, irregular lesions. Potassium deficient crops tend to produce small, thin storage roots of poor quality. Orange-fleshed varieties usually have a paler-than-normal flesh colour. Possible confusion with other symptoms The appearance of an interveinal chlorotic mottle or small necrotic pits in interveinal tissue of leaves of intermediate age may resemble symptoms of manganese deficiency. However, in the case of manganese deficiency, the green zones around veins are broader and more diffuse. The absence of symptoms on the youngest leaves, and the occurrence of necrotic lesions on the oldest leaves indicate potassium deficiency. On older leaves, interveinal patches of necrosis surrounded by yellow areas are also symptomatic of magnesium deficiency. Magnesium-deficient crops are generally pale all over, and the pattern of interveinal chlorosis is usually more regular, with the major veins remaining green for their entire length. Diagnostic soil and plant tissue tests The determination of a critical concentration for potassium in sweetpotato leaves is complicated by the fact that sweetpotato has some capacity to substitute sodium for part of its potassium requirement. In the presence of sufficient sodium, a critical concentration of 2. In solution culture experiments with very low sodium concentrations, the critical concentration for K was found to be approximately 4. The maximum substitution effect seems to be achieved at relatively low sodium concentrations, which would be found in most soils. Therefore, a critical concentration of 2. This appears to be consistent with field measurements from crops which responded to potassium fertiliser. Crop responses to potassium fertilisation are generally expected at exchangeable potassium values in the range 0. In heavier soils, a positive correlation between sweetpotato yield and exchangeable potassium has been reported over a range of 0. Management Cultural control Since sweetpotato crops remove a considerable amount of potassium from the soil approximately 8 kg potassium in storage roots plus vines per 1 tonne of roots , continuous cropping without fertilisation can lead to the exhaustion of soil potassium reserves. Potassium deficiency occurs most commonly on sandy soils, which have a low capacity to bind cations such as potassium, and on highly weathered soils with low cation status. Potassium can be added to the soil either in the form of inorganic

fertiliser or in organic mulches and composts. Organic mulches are much more bulky than inorganic fertilisers, therefore requiring more labour, but the efficiency of nutrient use by the crop may be higher. Mulches of fresh plant material have a higher potassium content than animal manures. Two applications of potassium are often used, one before planting and one after four weeks of growth, with the fertiliser banded along the row. This practice is most advisable on light-textured soils which may lose a lot of potassium by leaching. It has been suggested that ploughing in potassium fertiliser to a depth of 40 cm may increase its efficiency, noting that it is the deeper roots which most actively provide potassium for storage root growth in the late stages of crop development. Such deep placement is rarely practised, other than by the burial of compost under mounds in some traditional production systems. Excessive application of potassium may lead to magnesium or calcium deficiency, due to depression of the uptake of these elements. On sandy soils in particular, magnesium and calcium applications may be necessary in addition to potassium to maintain a favourable balance. Influence of nitrogen and potassium fertiliser on growth of sweet potato Ipomoea batatas in Papua New Guinea. Field Crops Research, 12, Fertilizer Guide for Tropical and Subtropical Farming. General introduction and inorganic fertilizer trials. A description of certain nutrient deficiency symptoms of the Porto Rico sweetpotato. Proceedings of the American Society for Horticultural Science 36, Soil fertility and sweet potato production on volcanic ash soils in the highlands of Papua New Guinea. Field Crops Research 19, Effect of potassium on the dry matter production of sweet potato. I, pp II- Soil chemical status and the prediction of sweet potato yields. Tropical Agriculture Trinidad 63, Sodium substitution of potassium in tropical root crops. Booker tropical soil manual: Booker Tate Ltd; Longman, London. Nutrient Disorders of Sweet Potato. Nutrient disorders of sweet potato and taro: International Institute for Tropical Agriculture. Response of cassava, sunflower and maize to potassium concentration in solution. Interactions between potassium, calcium and magnesium. Field Crops Research 1,

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3: Calcium/Magnesium/Vitamin D Information - www.enganchecubano.com

Potassium, calcium, and magnesium in the tropics and subtropics / by Robert D. Munson.

Printed in the Netherlands. We estimated the fluxes, inputs and outputs of Ca, K, and Mg in a Mexican tropical dry forest. The study was conducted in five contiguous small watersheds 12â€”28 ha gauged for long-term ecosystem research. We quantified inputs from the atmosphere, dissolved and particulate-bound losses, throughfall and litterfall fluxes, and standing crop litter pools. Mean cation inputs for a six-year period were 3. Mean outputs in runoff were 5. Calcium, K, and Mg concentrations increased as rainfall moved through the canopy. Annual Ca return in the litterfall Calcium concentration in standing litter 3. These concentrations were higher Ca , lower K , or similar Mg to those in litterfall. Residence times on the forest floor were 0. Compared to the residence time for organic matter at the site 1. Budget estimates were calculated for a wet and a dry year. Results indicated that nutrients accumulated in the dry but that nutrients were lost during the wet year. Comparison of Ca, K, and Mg losses in stream water with the input rates from the atmosphere for the six-year period show that inputs are lower than outputs in the Chamela tropical dry forest ecosystem. Biogeochemical processes in these ecosystems have 22 not been studied as extensively as in the tropical moist forest. Nutrient fluxes include deposition, throughfall, litterfall, weathering, and runoff losses. Although some of these have been studied individually in TDF, none of the studies have included a more general and integrated treatment of these fluxes. Litterfall nutrient concentrations directly feed back on soil over a relative short time and provide an indication of soil nutrient availability in tropical forests Vitousek Basic cations such as Ca, K, and Mg play important roles in a variety of plant functions. Calcium, a non-toxic mineral nutrient, is predominantly active in cell walls and plasma membranes and participates in control mech- anisms of plant growth and development Marschner Magnesium is a key element in chlorophyll and other enzyme molecules. In contrast, K is not a constituent of organic structures but functions mainly as an osmoregulator and in the regulation of enzyme activities. From a biogeochemical perspect- ive the dominant source of these cations is rock weathering and their loss in streamwater relative to their concentration in bedrock tends to be among the highest of several elements Schlesinger Cycling processes differ greatly among Ca, K, and Mg. Magnesium tends to be intermediate in its tendency to retranslocate from plant foliage Parker One way to evaluate the relative importance of the soil as a nutrient source to an ecosystem is to compare the rates of nutrient inputs from the atmo- sphere with the rates of nutrients leaching out of the system Jordan Input-output budgets for tropical forest ecosystems have been reviewed by Bruijnzeel but none of the studies included a tropical dry forest site. This suggests that comprehension of nutrient cycling in dry tropical regions is far from complete. In this paper we consider the cycle of the base cations Ca, K, and Mg. A first objective of our study was to estimate the cation input by precipitation and output in stream water. A second objective was to determine the relative importance of throughfall, litterfall, and litter decomposition in cation cycling of this tropical dry forest. This area is characterized by a mean temperature of Average runoff is 5. The predominant lithology includes Tertiary volcanic of rhyolitic and rhyodacitic composition and their tuff Campo The soils are young, shallow 0. Organic matter content in the upper soil profile 20 cm is 2. The forest is dominated by deciduous trees, 6 to 10 m in height Lott et al. Lott reports plant species from families for the Biolo- gical Station. Three permanent plots were established along the altitudinal gradient on one of the watersheds Water- shed I. The rest of the watersheds Watershed II to V included only one 24 permanent plot at the middle position. Only the five middle position plots were used to study the nutrient fluxes in litterfall and throughfall, and the standing litter see below. Input from the atmosphere Calcium, K, and Mg entering the ecosystem by bulk deposition were measured during a 6-yr period â€” Samples were collected in six polypropylene bulk precipitation collectors maintained in cleared areas within a radius of 2 km from the study site. The precipitation collectors were made with polypropylene funnels 12 cm diameter connected to 2 l polypro- pylene reservoirs by tygon tubing. Each reservoir was attached to a vapor trap and a vapor barrier

formed by a loop in the tubing to prevent evaporation and gas exchange with the atmosphere. The entrance to the collector was covered with a thin layer of glass wool to prevent contamination from insects and bird excrement. The reservoir and tubing were kept from sunlight to avoid algal growth. Samples were stored in polypropylene containers, analyzed for pH and kept refrigerated. The deionized water used for washing and rinsing the collectors was periodically analyzed to check for contamination through washing and manipulation. Wet and dry depositions were sampled together after every rainfall event, thus a slight underestimation of nutrient input may have occurred as a result of an infrequent sampling of dry deposition during the rainless period. Calcium, K, Mg, and Na entering the ecosystem were calculated by multiplying the rainfall amount by the element concentrations. Sodium meas- urements were included to determine the potential sources of the cations Drever Rainfall amount was determined with two rain gauges and one recording rain gauge. Losses from the watershed Dissolved Ca, K, and Mg exported from the ecosystem were evaluated for a 6-yr period â€” , in the five small watersheds. Coschocton wheels were used to sample the runoff water, which was stored in polypropyl- ene containers 50 l capacity following the same procedure as for the rain samples see above. Drain water was collected after each event and analyzed accordingly. Nutrients were analyzed in ml aliquots of drain water from each of the three containers and the five watersheds, for every runoff event. Fifty microliters of phenyl mercuric acetate solution 0. Losses of particulate-bound Ca, K, and Mg, were estimated by collections of sediments and particulate organic material trapped at the mouth of the gauged watershed-ecosystem. Material was collected in three 10 cm, 5 cm and 2 cm mesh nets from water passing through the gauged weir and in a sediment trap behind the net at the weir during a 2-yr period â€” Particulate organic matter was ground in a Wiley Mill. Dissolved Ca, K, and Mg fluxes leaving the watershed were calculated as the product of the nutrient concentration in the runoff by the amount of water drained from the watershed. The particulate-bound Ca, K, and Mg exported from the watershed were estimated as the product of the nutrient concentration by the amount of organic matter or sediment output from the watershed. Cation flux in throughfall Throughfall was collected during the 6-yr period â€” from six collectors at the plot on Watershed I. Each collector consisted of a polyvinyl chloride PVC channel 0. The reservoir was attached to a vapor trap similar to bulk precipitation col- lectors. Reservoir and tubing were kept from sunlight to avoid algae growth. Water samples were treated as described for the rainfall samples. Calcium, K, and Mg returned to soil in throughfall was determined by multiplying the throughfall amount by its element concentration. Net nutri- ent throughfall was calculated by subtracting element mass in the bulk deposition. As bulk precipitation collectors are inefficient in collecting dry deposition, the results could overestimate nutrient flux to the soil by canopy leaching. Cation flux in litterfall Flux was calculated multiplying litterfall production by its cation concentra- tions. Production data came from a long-term study A. Cation concentration was determined in samples for a one-year period Cation pools in litter Cation pools were calculated multiplying standing litter mass by cation concentrations. Litter was collected from twelve 20 cm diameter microplots in January, May, September, and November. Chemical analysis Rainfall, throughfall, and runoff samples were filtered to remove the suspen- ded material. Sediment samples were air-dried and ground to pass a 2 mm sieve. Calcium, K, and Mg in particulate organic matter, litterfall and litter samples, were determined with 0. The ash was dissolved in 5 ml of 4 N HCl solution. The solution was filtered and then diluted to 50 ml with deionized water. Potassium and Na were analyzed by flame emission, and Ca and Mg by atomic absorption, atomizing in air-acetylene flame. Concentrations were corrected with deionized water blanks. Correlations among throughfall fluxes with rainfall depth, throughfall depth, open rain concentrations of each mineral and rain pH were performed. Spatial and temporal variation of cation fluxes in litterfall and throughfall and pools in the forest soil were analyzed by ANOVA. Rainfall variation between years was very high Table 1. Its pH during the study period was 4. Mean nutrient inputs by bulk deposition were 3. Losses of nutrients from the watershed Water does not flow continuously in the Chamela experimental watershed streams. Between one and six runoff events per year occurred during the study period with a mean annual runoff of 86 mm Table 1. Concentrations of dissolved Ca, K, and Mg in stream water were higher than in bulk deposition. A yearly

comparison of runoff losses from the ecosystem with input rates from the atmosphere showed that leaching loss was generally higher. Particulate matter and sediments represented a minor cation loss 1. However, their contribution to total nutrient output in a dry year was Intrasystem cycling Ca, K, and Mg in throughfall The proportion of the rainfall which reached the forest floor as throughfall between and was Concentrations of Ca, K, and Mg increased as rainfall moved through the canopy. The annual mean values with S. The amounts of minerals in throughfall were 0.

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4: Okra is rich in potassium, calcium, folate, Vitamin K & Vitamin C

During July, August, and September of , daily aerosol measurements were made at three station in the tropical North Atlantic: Sal Island, Cape Verde Islands; Barbados, West Indies; Miami, Florida. The two major components of the aerosols at each station were mineral aerosol, comprising Saharan dust, and sea salt.

It is used to help growth and good health. It may be given to you for other reasons. Talk with the doctor. If you are allergic to any drugs like this one, any other drugs, foods, or other substances. Tell your doctor about the allergy and what signs you had, like rash; hives ; itching; shortness of breath; wheezing; cough; swelling of face, lips, tongue, or throat; or any other signs. This medicine may interact with other drugs or health problems. Tell your doctor and pharmacist about all of your drugs prescription or OTC, natural products, vitamins and health problems. Do not start, stop, or change the dose of any drug without checking with your doctor. This includes your doctors, nurses, pharmacists, and dentists. This medicine may affect certain lab tests. If you are allergic to tartrazine, talk with your doctor. Some products have tartrazine. This medicine prevents many other drugs from getting into the body. Tell your doctor if you are pregnant or plan on getting pregnant. Tell your doctor if you are breast-feeding. You will need to talk about any risks to your baby. Read all information given to you. Follow all instructions closely. Take with or without food. Take with food if it causes an upset stomach. What do I do if I miss a dose? Take a missed dose as soon as you think about it. If it is close to the time for your next dose, skip the missed dose and go back to your normal time. Do not take 2 doses at the same time or extra doses. Dosage Information in more detail What are some side effects that I need to call my doctor about right away? Even though it may be rare, some people may have very bad and sometimes deadly side effects when taking a drug. Tell your doctor or get medical help right away if you have any of the following signs or symptoms that may be related to a very bad side effect: Signs of an allergic reaction, like rash; hives; itching; red, swollen, blistered, or peeling skin with or without fever; wheezing; tightness in the chest or throat; trouble breathing, swallowing, or talking; unusual hoarseness; or swelling of the mouth, face, lips, tongue, or throat. Very loose stools diarrhea. Very hard stools constipation. All drugs may cause side effects. However, many people have no side effects or only have minor side effects. Call your doctor or get medical help if any of these side effects or any other side effects bother you or do not go away: Upset stomach or throwing up. These are not all of the side effects that may occur. If you have questions about side effects, call your doctor. Call your doctor for medical advice about side effects. You may also report side effects at http: If you think there has been an overdose, call your poison control center or get medical care right away. Be ready to tell or show what was taken, how much, and when it happened. Store at room temperature. Store in a dry place. Do not store in a bathroom. Keep all drugs in a safe place. Keep all drugs out of the reach of children and pets. Throw away unused or expired drugs. Do not flush down a toilet or pour down a drain unless you are told to do so. Check with your pharmacist if you have questions about the best way to throw out drugs. There may be drug take-back programs in your area. Consumer information use If your symptoms or health problems do not get better or if they become worse, call your doctor. Keep a list of all your drugs prescription, natural products, vitamins , OTC with you. Give this list to your doctor. Talk with the doctor before starting any new drug, including prescription or OTC, natural products, or vitamins. Some drugs may have another patient information leaflet. Check with your pharmacist. Further information Always consult your healthcare provider to ensure the information displayed on this page applies to your personal circumstances.

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