

# Calcium and Magnesium Levels of soils in Buso, Mati, Davao Oriental

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## **Abstract**

Calcium and magnesium levels in soils from five sites of Barangay Buso, Mati, Davao Oriental were analyzed based on twenty (20) composite samples, and with the use of Atomic Absorption Spectrophotometer, from November to December 2003. Sitio Bangkal had the highest calcium level and lowest level was obtained from Buso Proper. Sitio Manga, Mainit and Casunogan had low levels of calcium. Magnesium level in Bangkal was also found highest of all the sitios and categorized under very high level. Medium levels were found both in Buso Proper and Sitio Mainit. Lowest level was obtained in Sitio Casunogan. The latter and Sitio Manga were categorized under low level. was sufficient. Only the areas planted to root crops were found to have the lowest calcium and magnesium levels and categorized as very low. Topography slightly affected the levels of calcium and magnesium in the area. Levels of these elements were determined to be lesser in hilly areas than in the plains. Areas planted to corn, grasses, mango, coconut and banana had medium and low levels of calcium while magnesium

**Keywords:** topography, vegetation, soil pH

## **Introduction**

Calcium is the third most important nutrient in the soil. Plants use it to build cell walls It lends strength to cell walls as a component of calcium pectate that makes fruits and vegetable crisp to the bite. Softening of tissues and often rotting like that in apples and tomatoes are attributed to the deficiency of this nutrient. Calcium being relatively immobile in the plants may be slow to reach the rapidly developing plant parts like shoot and root tips and young fruits (Recel, 1998).

Magnesium's role in plant differs with calcium. It is an essential ingredient of chlorophyll whose molecule has one magnesium atom at its center. Like potassium, it activates a number of enzyme systems. It is also involved in protein, carbohydrate and fat synthesis as well as a wide range of other organic compounds. Deficiency of these elements results in less resistance to drought, cold and diseases (Brady, 1984).

While both differ in their plant nutritional roles, calcium resembles magnesium chemically and its role in the soil. However, clay holds magnesium less strongly than calcium, so it is more leached.

In general, the most important role of these nutrients in soil fertility management is in the maintenance of soil pH. Soils with high level of these elements indicate alkalinity while soils having relatively lower levels tend to be acidic. Liming adds calcium and magnesium to soil thereby increasing pH and correcting acidity to level suitable for crop production.

As one of the major crops producing areas in Matil Buso has a total of 11453 hectares devoted to crop production of which 1,253 hectares are planted to plantation crops and vegetables and 200 hectares are grown with corn and other agronomic crops

No data are available to show the calcium, magnesium and NPK levels of the area. Farmers have no idea about the pH levels of the soil and have not practiced liming.

This study aimed to evaluate the nutrient levels of soils in Buso, Mati, Davao Oriental specifically its calcium and magnesium contents through soil analysis; and find out their relationship with topography and dominant vegetation.

### **Methodology**

Barangay Buso consists of eight sitios, five of which are intensively used in crop production and are identified as sampling areas for the study. Exact locations and boundaries were determined by the aid of the farmers and some barangay officials in the area.

Soil samplings were done during dry periods for ease in collection and handling. Five to ten sampling cores were identified per hectare following the ‘Z’ pattern for plain and ‘W’ pattern for hilly areas.

The surface of the area dug was cleared of weeds and other foreign materials. Areas near fertilizer band, household, animal manures, burning and garbage were disregarded. A slanting thrust a shovel was made up to 30 cm depth in the soil. The soil on the shovel was discarded and another thrust on the same surface about 1 to 2 inches thick was made and the soil was saved. Same procedure was done until 5 to 10 cores were collected and then thoroughly mixed, quartered and a kilogram of it was saved.

A total of five kilograms soil from five to ten cores were then mixed and quartered to come up with a composite sample representing an area in a sitio. At least four composite samples were collected in each sitio. These were all placed in a clean plastic bag, labeled, air-dried and pulverized using non-metal instrument. A total of

20 soil samples were brought for analysis to the Regional Soils Laboratory of the Department of Agriculture in Davao City.

Topography was descriptively identified as plain or hilly based on ocular observation. Vegetation present in the area of collection was noted.

## Results and Discussion

### Calcium and Magnesium Levels

Sitio Bangkal exhibited the highest level of calcium while lowest level of this nutrient was found in Buso Proper (Table 1). Magnesium was found to be highest in Sitio Bangkal and the lowest was in Sitio Casunogan.

Table 1. Calcium and magnesium levels in Buso, Mati, Davao Oriental

Sitio	Calcium		Magnesium	
	Concentration (ppm)	category	Concentration (ppm)	category
Buso Proper	1002.00	Low	411.00	Medium
Bangkal	3527.00	High	845.12	Very High
Manga	1913.82	Low	240.16	Low
Casunogan	1538.07	Low	179.36	Low
Mainit	1237.47	Low	437.76	Medium

**Nutrient levels as influenced by topography.**

Calcium was less available in areas with rolling to hilly topography and was found higher in plain or level areas (Table 2). Same result was obtained for magnesium. The levels of these nutrients decrease as the slope of the land increases (Bontia, 2001).

Table 2. Influence of topography on calcium and magnesium levels

Topography	Calcium		Magnesium	
	(ppm)	category	(ppm)	category
plain	2147.33	Medium	503.76	High
rolling/hilly	1387.77	Low	308.56	Medium

Areas that were planted to corn were determined to have the highest level of calcium followed by those planted to coconut, mango and banana. The lowest level of this nutrient was in areas where root crops were grown (Table 3). Magnesium on the other hand was abundant in areas planted to coconut followed by those with corn, mango, grasses and banana. Lowest level of this nutrient was obtained in areas planted

to root crops. Root crops tend to consume most of these nutrients than plantation and agronomic crops.

Table 3. Influence of vegetation on calcium and magnesium Levels

Vegetation	Calcium		Magnesium	
	(ppm)	category	(ppm)	category
Corn	2272.54	Medium	437.76	Medium
Mango	1919.83	Low	428.03	Medium
Coconut	1963.92	Low	459.65	Medium
Banana	1603.20	Low	182.40	Low
Rootcrops	561.12	Very Low	60.08	Very Low
Grasses	1362.72	Low	322.24	Medium

### Summary and Conclusions

Calcium and magnesium levels in soils of Buso, Mati, Davao Oriental were determined. A total of 20 composite samples from the five sample sites were analyzed by the DA-Soils Laboratory in Davao City.

Sitio Bangkal had the highest level of calcium and magnesium and were categorized as high and very high, respectively. Lowest levels of calcium and magnesium were obtained in Buso Proper and Sitio Casunogan, respectively.

Topography affected the levels of both mineral nutrients. These were found to be higher the plains than in rolling or hilly areas.

Areas planted to corn were found to have the highest level of calcium while those planted to coconut had the highest magnesium level. Very low levels of these nutrients were determined in soils from areas planted to root crops such as cassava and sweet potato.

Soil calcium in Buso was available in low level based on the soil test. However, magnesium was available in sufficient amount based on categorization although test values obtained in Sitio Manga and Casunogan showed low level category.

### Recommendation

It is recommended that liming be done in areas planted to root crops specially in rolling to hilly areas. Planting of cover crops may be done to prevent soil erosion in hilly areas and rapid depletion of calcium and magnesium. Farmers should practice crop rotation to minimize depletion of these nutrients where no liming is done.

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