

INFLUENCES OF AGROCOCO MEDIUM COIR ON pH & EC

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August 2007*

INTRODUCTION

With increased emphasis on sustainable, organic, and recyclable horticulture there is an increased interest in using coconut coir fiber in growing substrates. Coir fiber from AgroCoco comes from Mexico and contains no significant sodium but is rich in potassium and phosphorus. It also has an excellent pH range (from 5.5 to 6.0). Growers and mix manufacturers are formulating blends using coir as a component, especially to replace sphagnum and other aggregates. The high potassium level raises concerns over how this blend component will influence the pH and soluble salt (EC) levels of the blends. Therefore in order to make suitable confident recommendations for formulations that include coir these studies were performed.

PURPOSE

This study was performed to measure the influence of coir on the pH and soluble salt levels (EC) in sphagnum based blends. The data will provide information on the liming properties of coir when used in blends containing sphagnum peat.

PROCEDURE

To test the liming properties of coir when blended with sphagnum it was necessary to compare the influence of lime and coir on the pH of the sphagnum and coir blends. Two studies were performed simultaneously to provide the data. One was to determine the effect of dolomitic lime on the pH of the sphagnum used for blending and the second was to determine the influence of coir on the pH of the sphagnum.

Dolomite-Sphagnum Study

Sphagnum peat from Fafard Peat Co. was blended with dolomitic lime from OSHO (liming equivalence of 104) at rates of 0, 3, 6, 9, 12, and 15 pounds per cubic yard. Eight replications of 5” pots were filled, moistened, and incubated on the bench at greenhouse temperatures. Tap water was added three times to maintain moisture. After two months the pH and EC of the blends were measured using the 2:1 method (2 parts distilled water mixed with 1 part substrate). Data from the eight replications were analyzed and averages are presented in Figures 1 & 3.

Coir –Sphagnum Study

Medium grade coir from AgroCoco was blended with sphagnum peat from Fafard Peat Co. at rates of 0, 20, 40, 60, 80, 100 percent sphagnum. No additional lime or fertilizer was added. Four replications of 10” pots were filled with each blend, stored on greenhouse benches and watered as needed to maintain normal moisture. After two months the pH and EC of the blends was measured using the 2:1 method. Data from the four replications were analyzed and the averages are presented in Figures 2 & 4.

RESULTS & DISCUSSION

While the two studies are not identical the data of each are valuable and can be used to interpolate what the influences on EC and pH may be when using medium grade AgroCoco coir in blends.

The EC increase from liming is minimal while the increase from added coir was much more significant. From the study of liming the sphagnum we see that the EC increased from 0.22 to 0.38 with the addition of 3 pounds of dolomite per cubic yard. That increased to up to only 0.43 when 12 pounds was added. It is highly likely that the further addition of lime did not “dissolve” significantly to further increase the EC. In the blends of sphagnum with coir we see that the 100% coir samples had an average EC of 1.04 after 2 months. That EC dropped to 0.61 with 60% coir and 40% sphagnum, and further to 0.36 with 20% coir and 80% sphagnum. The 100% sphagnum blend averaged 0.23 in this study and 0.22 in the liming study. These similar results imply that the controls in each study were the same and that gives more certainty to comparison of the studies. We also can see in Figure 2 that for each one percent coir added to the blend the EC increases an average of 0.081 units above the sphagnum base EC of 0.23. Thus in blending coir with sphagnum based blends we can expect some increases in the EC. As we know this is due to the rich potassium level of the coir and the high solubility of the potassium.

The pH influences of coir can be assessed from the coir sphagnum blends (Figure 4). The data show that the average pH of the 100% coir blend was 5.7 while the pH of the sphagnum was 4.1. Since the pH value is a logarithmic term we do not expect a linear response but instead a curved response. That response has been calculated and is statistically represented in the trend line presented. Note that the trend line shows a very good fit to the data (99% in the blend study and 98% in the liming work). We can thus take any point on the line to predict what the liming or blending effects on pH will be for similar blends. By taking the pH of a 50% coir and 50% sphagnum blend from Figure 4 and finding that pH on the line in Figure 3 we can estimate the liming effect of the 50% coir on the 50% sphagnum. In doing that (see circles) we see from figure 4 that 50% coir provided a pH of about 4.7 and from Figure 3 we see that 100 % sphagnum reaches a pH of 4.7 with the addition of about 2.2 pounds of dolomitic lime.

Therefore, since we had 50% sphagnum half the lime would be needed equaling 1.1 pounds. So 50% or ½ cu. yd. of coir provided the equivalent of 1.1 pounds of lime. Therefore, in this study one full yard of coir would contribute 2.2 pounds of dolomitic lime equivalence along with the coir fiber. The liming effect is likely due to the freely soluble potassium that is available to absorb on the cation exchange sites of the sphagnum. That increases the percentage of base saturation on the exchange sites yielding increases in pH of the blend. While the impact on pH is small for some applications it has an effect and can be significant in limited situations. This information then should be applied in calculations and formulations for precision blends.

CONCLUSIONS

In these projects we have several pieces of information that will be helpful in applications to blending medium grade coir from AgroCoco for horticultural use. It is important to recognize that this is from two studies using only one lot of medium grade coir. Additional studies should be made before extreme precision is expected or required.

In these studies we saw that medium grade coir from Agro oco:

1. Averaged a pH of 5.7 and an EC (2:1) of 1.04 when incubated in the greenhouse for two months.
2. Contained salts (largely **potassium**) that influenced the EC of the blend, contributing 0.081 units EC for each percent coir added.
3. Increased the pH of blends.
4. Reduced the lime requirements in a blend by about 2.2 lbs of lime per cu. yd. medium grade coir added.