ORGANIC FERTILIZER AND HUMIC SUBSTANCE EFFECTS ON LETTUCE CHARACTERISTICS AND NUTRITION

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ABSTRACT

The aim of this work was to test organic fertilizers, liming, and levels of soil conditioner composed by humic and fulvic acids on the characteristics and nutrition of “iceberg” lettuce. The experimental design was completely randomized in a 5x3x2 factorial scheme, in which 5 levels of soil conditioner (0, 20, 40, 100, 200 L ha-1), 3 fertilizers (chicken manure, organic compost and mineral), and liming (with or without) Lettuce shoot fresh and dry weight, shoot commercial fresh and dry weight, height, circumference, and number of leaves were evaluated. Lettuce grown with chicken manure rendered the greater circumference and higher shoot fresh commercial weight, which are the most important lettuce characteristics affecting consumer purchase decisions. The soil conditioner did not influence on plant growth, except height and dry shoot weight on a very small scale.

INTRODUCTION

Nowadays, studies on the use of organic materials are very important as the price of fertilizers is increasing globally. Chicken as well as cattle manure complex toxic Al, enhances soil pH, and phosphorus, calcium, and magnesium content. However, there is a small amount of information concerning effects of chicken manure, and organic compost on lettuce characteristics and nutrition. Several kinds of soil conditioners, produced from organic sources, such as organic composts, humus, and coal, are being sold in the market. The humic compounds may be absorbed by roots and transported to shoots, thus enhancing the growth of the whole plant (Luíkis and Petasas, 1995). Effects of soil conditioners on plants were reported to improve the soil chemically, increases cation exchange capacity, stimulates microbial activity, increases soil capacity to complex and solubilize ions, complexes nutrients and toxic aluminum (Stevenson, 1994). However, there are divergent findings about humic substance effects on plants. Its effects may be attributed to many factors, including the nature, source and concentration of humic substances, soils, pH, plant species and growth parameters being measured (Luíkis and Petasas, 1995).

OBJECTIVE

Evaluate effects of organic and mineral fertilizers, liming, and use of soil conditioners on the characteristics and nutrition of “iceberg” lettuce.

MATERIALS & METHODS

The experiment was conducted in a greenhouse. Samples of a Typic Dystrudepts were collected. Soil physical and chemical characteristics were: pHwater = 5.2; P (Mehlich I) = 0.6 mg dm-3; K = 12.0 mg dm-3; Ca = 0.8 cmolc dm-3; Mg = 0.2 cmolc dm-3; Al = 0.5 cmolc dm-3; HaV = 3.2 cmolc dm-3; organic carbon = 14.1 mg g-1; Zn = 0.3 mg dm-3; B = 25.48 mg dm-3; Mn = 8.1 mg dm-3; Cu = 0.5 mg dm-3; B = 0.5 mg dm-3; S-sulphate = 4.9 mg dm-3; Sand = 130 g kg-1; Silt = 280 g kg-1; Clay = 580 g kg-1.

Table 1 Organic fertilizers and soil conditioner characteristics.

Table 2 Nutrient content in lettuce plants grown in a Triticale Dysstrudepts

RESULTS AND DISCUSSIONS

The soil conditioner did not influence lettuce height and dry shoot weight, except height and dry shoot weight on a very small scale.

Figure 1. Iceberg lettuce grown with mineral fertilizers and liming (left); organic compost without liming (center); and chicken manure rendered the greater circumference and higher shoot fresh commercial weight, which are the most important lettuce characteristics affecting consumer purchase decisions. The soil conditioner did not influence on plant growth, except height and dry shoot weight on a very small scale.

REFERENCES


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