

WALLACE LABORATORIES, LLC

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September 9, 2013

Fax 877/271-3122
ATTN: Nicole Hourian
Hourian Associates
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San Clemente, CA 92672

RE: Chick-fil-A, Columbus Pkwy & Admiral Callaghan Lane, Vallejo CA
Sample A, 6", Our Sample ID 13-249-14

Dear Nicole and John,

The soil is modestly alkaline with a pH of 7.38. The salinity is modest at 0.60 millimho/cm. Nitrogen and phosphorus are low. Potassium is moderate. Iron and boron are modest. Manganese is high. Magnesium is high. High magnesium restricts the uptake of calcium and potassium. Sulfur is low. Sodium is low.

Recommendations

General soil preparation for turf, ground cover and shrub areas. Broadcast the following materials uniformly. The rates are per 1,000 square feet. Incorporate them homogeneously 6 inches deep:

Ammonium sulfate (21-0-0) – 5 pounds
Triple superphosphate (0-45-0) – 4 pounds
agricultural gypsum – 40 pounds
organic soil amendment – several cubic yards depending on the material

For the preparation of backfill mix for container plants and boxed trees, homogeneously blend the following materials into excavated soil. Rates are expressed per cubic yard:

Ammonium sulfate (21-0-0) – 1/4 pound
Triple superphosphate (0-45-0) – 1/4 pound
agricultural gypsum – 2 pounds
organic soil amendment – about 15% by volume depending on the material

The soil amendment needs to be based on leafy greens, compost or other similar in order to provide micronutrients.

For site maintenance, apply ammonium sulfate (21-0-0) at 5 pounds per 1,000 square feet about once per quarter. Apply gypsum at 10 pounds per 1,000 square feet two to three times a year, or as needed, to control the magnesium. Monitor the site with periodic soil testing.

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Organic soil amendment:

1. Humus material shall have an acid-soluble ash content of no less than 6% and no more than 20%. Organic matter shall be at least 50% on a dry weight basis.
2. The pH of the material shall be between 6 and 7.5.
3. The salt content shall be less than 10 millimho/cm @ 25° C. on a saturated paste extract.
4. Boron content of the saturated extract shall be less than 1.0 parts per million.
5. Silicon content (acid-insoluble ash) shall be less than 50%.
6. Calcium carbonate shall not be present if to be applied on alkaline soils.
7. Types of acceptable products are composts, manures, mushroom composts, straw, alfalfa, peat mosses etc. low in salts, low in heavy metals, free from weed seeds, free of pathogens and other deleterious materials.
8. Composted wood products are conditionally acceptable [stable humus must be present]. Wood based products are not acceptable which are based on red wood or cedar.
9. Sludge-based materials are not acceptable.
9. Carbon:nitrogen ratio is less than 25:1.
10. The compost shall be aerobic without malodorous presence of decomposition products.
11. The maximum particle size shall be 0.5 inch, 80% or more shall pass a No. 4 screen for soil amending.

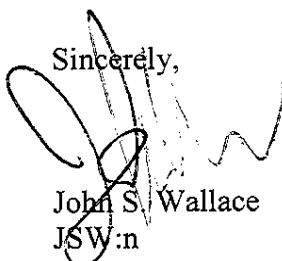
Maximum total permissible pollutant concentrations in amendment in parts per million on a dry weight basis:

arsenic	20	copper	150	selenium	50
cadmium	15	lead	200	silver	10
chromium	300	mercury	10	vanadium	500
cobalt	50	molybdenum	20	zinc	300
		nickel	100		

Higher amounts of salinity or boron may be present if the soils are to be preleached to reduce the excess or if the plant species will tolerate the salinity and/or boron.

For site maintenance, apply ammonium sulfate (21-0-0) at 5 pounds per 1,000 square feet about once per quarter. Monitor the site with periodic soil testing.

Sincerely,



John S. Wallace
JSW:n

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SOILS REPORT

Print Date Sep. 6, 2013 Receive Date 9/5/13

Location Chick-fil-A, Columbus Pkwy & Admiral Callaghan Lane, Vallejo CA

Requester Nicole Hourian, Hourian Associates

graphic interpretation: * very low, ** low, *** moderate

ammonium bicarbonate/DTPA

**** high, ***** very high

extractable - mg/kg soil

Sample ID Number 13-249-14
 Sample Description Sample A, 6"

Interpretation of data

low medium high

elements graphic

0 - 7 8-15 over 15

phosphorus 5.48 **

0-60 60 -120 121-180

potassium 175.00 ****

0 - 4 4 - 10 over 10

iron 6.43 ***

0- 0.5 0.6- 1 over 1

manganese 14.59 *****

0 - 1 1 - 1.5 over 1.5

zinc 2.18 ****

0- 0.2 0.3- 0.5 over 0.5

copper 4.58 *****

0- 0.2 0.2- 0.5 over 1

boron 0.12 **

calcium 311.37 ***

magnesium 853.59 *****

sodium 18.84 *

sulfur 8.57 *

molybdenum n d *

nickel 1.72 **

The following trace elements may be toxic
 The degree of toxicity depends upon the pH of the soil, soil texture, organic matter, and the concentrations of the individual elements as well as to their interactions.

aluminum n d *

arsenic 0.06 *

barium 4.14 **

cadmium 0.04 *

chromium 0.02 *

cobalt 0.29 *

lead 1.06 **

lithium 0.32 *

mercury n d *

selenium n d *

silver n d *

strontium 2.21 *

tin n d *

vanadium 0.19 *

The pH optimum depends upon soil organic matter and clay content- for clay and loam soils: under 5.2 is too acidic

6.5 to 7 is ideal

over 8.0 is too alkaline

The ECe is a measure of the soil salinity:

1-2 affects a few plants

2-4 affects some plants,

> 4 affects many plants.

Saturation Extract

pH value 7.38 ***

ECe (milli-mho/cm) 0.60 **

millieq/l

calcium 62.8 3.1

magnesium 35.5 2.9

sodium 9.6 0.4

potassium 7.2 0.2

cation sum 6.7

problems over 150 ppm

chloride 33 0.9

good 20 - 30 ppm

nitrate as N 1 0.1

toxic over 800

phosphorus as P 0.5 0.0

sulfate as S 8.4 0.5

anion sum 1.5

toxic over 1 for many plants

boron as B 0.18 *

increasing problems start at 3

SAR 0.2 *

est. gypsum requirement-lbs./1000 sq. ft.

202

relative infiltration rate fair

estimated soil texture clay

lime (calcium carbonate) no

organic matter low/fair

moisture content of soil 5.2%

half saturation percentage 32.2%

Elements are expressed as mg/kg dry soil or mg/l for saturation extract.

pH and ECe are measured in a saturation paste extract. nd means not detected.

Analytical data determined on soil fraction passing a 2 mm sieve.