



## Abstract:

Products being marketed to homeowners as Garden Soils are labeled to produce large and trouble-free vegetables and flowers, and yet the packaging contain very little information about the contents of the bag. Six samples of these products (Miracle Gro Organic Choice, Jungle Growth, Sta-Green MX, Scotts Topsoil, Evergreen, and Sta-Green) were purchased and evaluated for pH, extractable phosphorous, potassium, calcium, organic matter, and water retention characteristics. The results showed that there were wide ranges of variability between these products. The pH ranged from 4.4 to 7.2, and similar wide ranges were noted for other nutrients. The materials also varied in their ability to retain water - percent water retention ranged from 25 to 100%. Two garden mixes (Miracle Gro and Sta-Green) were used to test the growth of turnips. Turnips vigorously grew in Sta-Green medium but not in Miracle Gro medium.

## Situation:

Home gardeners regularly seek recommendations from their local extension office on which garden soil is best for growing flowers and vegetables. Many times, they are uncertain which product to purchase because of lack of nutrient information on the packaging. It is also common for many home gardeners to be misled by brightly colored pictures as marketing strategy with very little information on the characteristics of the materials. To better assist our clientele, we evaluated six (6) garden soils that are sold in our local garden stores.

## Objectives:

- Determine the nutrient composition of each garden soil through laboratory analysis.
- Determine the water retention characteristics of each garden soil.
- Determine the growth performance of turnips grown on selected garden soils.

## Materials and Methods:

- **Garden Soil:** The following products labeled as garden soil were obtained from a local store:

1. Miracle Gro Organic Choice
2. Jungle Growth
3. Sta-Green MX
4. Scotts Topsoil
5. Evergreen
6. Sta-Green



- **Subsampling For Chemical Analysis:** Each bag was opened, contents were mixed well, and a 100 gram subsample was submitted to the University of Georgia Soil Testing Laboratory for chemical analysis. Each material was tested for pH, extractable phosphorus (P), potassium (K), calcium (Ca), and magnesium (Mg). Three selected garden soils were tested for organic matter (OM) content.

- **Measurement of Relative Water Retention Characteristics:**
  1. 170 grams of each garden soil was weighed and placed into a plastic pot with perforated bottom.
  2. Each pot was suspended on a metal rack, and an intact cup was placed beneath each pot to serve as catchment (see Figure 1).
  3. Fifteen (15) milliliters of water was slowly poured into each soil and liquid was allowed to drain into the catchment cups.
  4. The amount of water that drained and collected was weighed and recorded.
  5. Samples were then left to sit and weighed daily until they came back to their original weight.



**Figure 1.** Set-up to measure soil's relative moisture characteristics

- **Qualitative Comparison of The Thickness of Organic Floaters**  
Ten gram samples were placed in canning jars and added with 200 milliliters of water, shaken for 5 minutes, and allowed to settle. The thickness of material floating in each jar was compared among each other (see Figure 2).



**Figure 2.** Demonstrates the floating organic material.

- **Performance of turnips grown in Sta-Green vs. Miracle Gro**  
One five-gallon bucket was filled with Sta-Green garden mix up to 5 inches from the top, and another bucket was filled with Miracle Gro. The material was then watered to bucket capacity, allowed to settle and then watered again the next day. Turnips were then planted in each bucket to the same depth. The buckets were then watered once per week until water came out the drain hole in the side of the bucket. Plant growth was compared between two growing media (see Figure 3).



**Figure 3.** Performance of turnips grown in two garden soils.

## Results and Discussion:

**Nutrient Contents.** There was a wide variation in pH and nutrient levels in the products tested as shown in Table 1.

Table 1. Chemical properties of various garden soils. Chemical analysis by Mehlich I method and Induction Coupled Plasma Spectrometry analytical technique.

Garden Soil	pH	Phosphorus (P)	Potassium (K)	Calcium (Ca)	Magnesium (Mg)	Zinc (Zn)
Miracle Gro	6.6	76	379	1572	518	8
Jungle Growth	7.2	64	209	5000	170	2
Sta-Green MX	5.5	242	712	371	84	3
Scotts Topsoil	6.1	119	464	1407	285	5
Evergreen	4.4	17	190	318	83	4
Sta-Green	5.6	243	766	550	107	7

One material, Evergreen, was very acidic and has lower nutritional value compared to the other mixes. In contrast, Jungle Growth garden mix was alkaline (pH 7.2) with moderate amounts of plant nutrients. Without this data, gardeners would have no basis for deciding which mix to use in their gardening efforts. Certainly, Evergreen is least desirable to use and others may be alright depending on the plant.

**Water Retention.** Sta-Green MX and Sta-Green were the most water retentive of the mixes. All the waters added (15 mL) were retained in both mixes (100% retention), and thus none was drained out. In contrast, Scotts topsoil retained only 25% of the water added. This property is important because it dictates water availability to plants. Water retention in other mixes ranged from 50-75% of the water added, much better than that of Scotts topsoil.

**Thickness of Floaters.** This was measured to estimate the amount of organic material in each mix. Interestingly, we did not find much difference in the thickness of floaters but all of them indicated high levels of organic matter (OM) consistent with data obtained from laboratory analysis (mean OM = 43%).

**Performance of Turnips.** Turnips grew more vigorously in Sta-Green medium than in Miracle Gro. **Figure 3** clearly shows the difference in growth, and these could be due to higher P and K in Sta-Green than in Miracle Gro (Table 1). Also, Sta-Green had better water retentive capacity than Miracle Gro (data not shown). There maybe other factors responsible for the growth difference, but this data will provide good information for the gardeners in deciding which material to use.

## Conclusions:

The purpose of this test was not to select winners and losers but to help us understand the nature of the material that many of our clients can potentially use to grow their plants. Knowing the nutrient contents including pH, water retention capacity, and other properties and understanding their effects on plant growth would aid the clientele to determine which product to use and be successful in the gardening endeavors. Sta-Green looks very promising, and Evergreen is the opposite. Evergreen and other products can be used in conjunction with other ingredients, but it is necessary to know first what is in the bag to determine the mix. Hence, this study was conducted.

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