Propagating Spearmint Plants (*M. spicata*) from Stem Cuttings

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Abstract

Mint plants can have a variety of different uses both commercially and residentially. In a commercial setting, mint can be used to produce dental hygiene products such as toothpaste and mouthwash. However, in a residential setting, people use it in foods, teas, baths, and even bug repellents. In light of its various uses, this study attempts to optimize the process of propagating spearmint plants (*Mentha spicata*) from stem cuttings to quickly and effectively produce mint leaves. This study compared various conditions of spearmint cuttings, including the use of a rooting hormone, indole-3-butyric acid. The study was conducted in a greenhouse over the course of a few months. The propagated mint plants were measured by number of roots, length of roots, size of the plants, number of leaves, and the SPAD meter readings on the leaves of the plants. Results of the propagation study are presented. This study works to improve current practices for mint propagation for commercial and residential use.

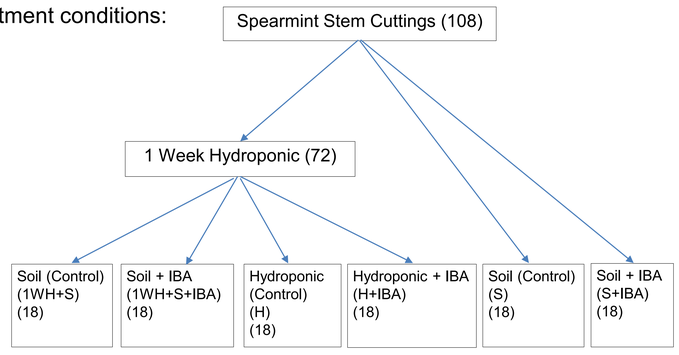
Introduction

Mint plants have been cultivated for thousands of years, being used by the ancient Egyptians (Singh et al., 2015). Today, the oil extracted from mint plants is used in the tobacco industry, food, cosmetics, and even pharmaceuticals. In fact, about 40% of mint oil produced is used in the tobacco industry, with the pharmaceutical and confectionary industries following closely behind. Other studies have been done to show the efficiency of indole-3-butyric acid (IBA), but these studies failed to compare the number and length of roots to the numbers of leaves (Rim and Jang, 2017). Although the whole plant can be used, the oil is typically extracted from the leaves before being commercially used.

Objectives

- Determine which conditions are optimal for propagating mint from stem cuttings.
- Gauge the impact of IBA on the growth of roots from stem cuttings and the chlorophyll content of leaves.

- Treatment conditions:



Methods

- 108 stem cuttings were collected from a healthy spearmint plant on February 14, 2022. Cuttings were randomly separated into six condition categories.
- 72 stem cuttings were placed in water for one week before 36 were moved to soil, while 36 remained in water. The other 36 stem cuttings were placed directly in soil.
- Some cuttings were dipped in powdered indole-3-butyric acid (IBA, Garden Safe, Bridgeton, MO)
- Cuttings were separated into individual cups/pots.
- Pots contained approx. 5-7 ounces of garden soil.
- Cups and pots were placed in a greenhouse where they were subject to temperatures ranging from 10-35 degrees Celsius.
- After four weeks, using vernier calipers, a magnifying glass, and a light box, the lengths of stems and roots of stem cuttings remaining in water were collected while the SPAD (Minolta Camera Co., Osaka, Japan) readings were collected from all stem cuttings.

Results

- Figure 1 depicts the average SPAD meter readings of each different treatment.
- Figure 2 depicts the average number of leaves of the mint stem cuttings after 4 weeks of the study, indicating that Condition H, produced a higher average number of leaves compared to Condition H+IBA
- Figure 3 depicts the average longest root length of the mint cuttings, indicating that Condition H+IBA, produced longer roots than H.
- Figure 4 depicts the number of roots, indicating that condition H+IBA grew more roots than H.
- Figures 5 and 6 depict examples of the roots produced under Condition H and Condition H+IBA.

Figure 1. Average SPAD Readings of Spearmint Leaves

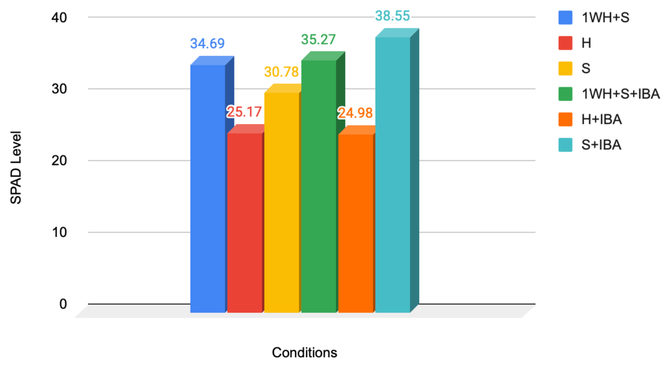


Figure 2. Average Number of Leaves of Spearmint Stem Cuttings

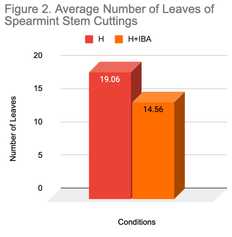


Figure 3. Average Length of Longest Root of Spearmint Stem Cuttings

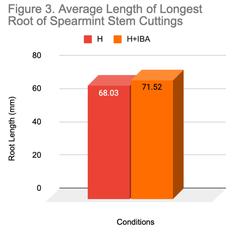


Figure 4. Number of Roots on Spearmint Stem Cuttings

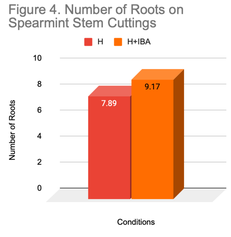


Figure 5. Condition H Roots

Figure 6. Condition H+IBA Roots

Conclusion

The data indicates some correlation between the IBA treatment and the health of the spearmint cuttings. When comparing the average root lengths of the spearmint cuttings, the treatment that received IBA exhibited more and longer roots compared to the control, indicating a focus on the root growth. The average lengths of the leaves was measured, showing no significant difference in the size of the leaves. However, the control cuttings had a higher average number of leaves. Because the leaves are what are mostly used for the collection of mint oils, these results exhibit an interesting compromise. It is hypothesized that over the course of four weeks, control stem cuttings tend not to focus as much resources and energy to root production but rather to leaf production, while the IBA encourages root production over leaf production. However, the SPAD meter readings for the plants that were treated with IBA tended to be higher, indicating that these plants may be healthier and stronger. In the future, other studies might conduct this same experiment on a longer time frame to find whether or not the plants that receive IBA will eventually surpass those that did not in leaf growth.

References

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