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Substituting Hemp Hurd Fiber for Peat in Plant Production

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Summary

Fiber products have become an interesting alternative to traditional substrate components. Hemp hurd fibers are a biproduct of other hemp uses and could be an alternative organic source for container production.

INTRODUCTION

Growers are interested in sustainable alternatives to peat moss for nursery plant container production. Substrates including coir, biochar and wood fiber have been the subject of recent research trials. Hemp (*Cannabis sativa*) farming has seen a resurgence since its legalization in 2018. Hemp stems consist of long bast fibers and short hurd fibers. The bast is desirable for the textile industry, however the hurd has fewer identified uses and is a byproduct of hemp production. Novel uses for hurd include hempcrete, wood paneling and animal bedding. I am conducting research to evaluate hurd as

a substitute for peat moss in container production of horticultural crops.

Hemp hurd fiber is available from a limited number of suppliers in a few different blends based on particle size. The first product tested had a 10 mm diameter particle size. Unfortunately, this product was rich in tannins that had to be washed from the substrate prior to potting, which was labor intensive. In addition, the product was contaminated with hemp seeds that germinated 1 to 3 days post transplanting. Seedings could be easily removed by hand; however, this was undesirable due to legal restrictions on growing hemp and added labor.

The second hurd product tested had 2 mm diameter particle size and was clear of tannin and seed contaminants. In experiments with petunia, hurd was substituted at three different rates (low, medium and complete replacement) for the peat portion of a 1:1 peat:vermiculite container medium **(Fig. 1**). The porosity of the four media tested ranged from 77% to 84%.

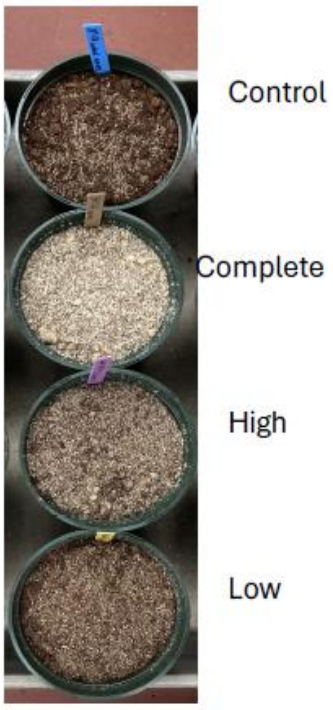

Figure 1. The four substrate treatments using different levels of hemp hurd.

In the first petunia experiment, plants received a low rate of controlled release fertilizer and constant liquid fertigation with a 20-10-20 product that was acidifying. After one week the pH of all media, except the complete replacement treatment, had dropped well below the recommended pH range for petunia. Upon changing to a 13-2-13, strong basifying fertilizer, the pH rebounded to acceptable range for the medium and complete replacement treatments and close to recommended range for the low and control treatments. Petunia plants grown in control and low treatments performed similarly, were visibly indistinguishable, and larger than plants grown in medium and complete replacement treatments (**Fig. 2**).

Figure 2. Petunia plant growth during experiment one.

In the second petunia experiment, a 15-5-15 basifying fertilizer was used and pH over time was more constant for all treatments; however, pH was below recommended range for the low and control treatments as in experiment 1. Performance of the medium treatment for some measured parameters had improved to match the low and control treatments in experiment 2.

These initial findings for petunia indicate that hurd may be a viable alternative for peat, but additional research is needed to evaluate fertilizer formulation and rate of delivery. Future work will evaluate hurd for other greenhouse crops like geranium and tomato and nursery crops including woody shrubs and herbaceous perennials.