

RECYCLING: RISKS AND REWARDS

Reusing growing media can turn your operation more eco-friendly, but don't let your plants suffer from improper practices. **By Brian E. Jackson**

THE DEMAND, USE AND NEED OF GROWING MEDIA WORLDWIDE is increasing due to the increased production of plants in containers and controlled environments. An industry that once primarily served the floriculture and ornamental nursery industries now serves a booming industry of container-grown vegetables, cannabis, herbs, leafy greens and small/soft fruit. The future is very promising and strong for the continued need of various growing media components as more and more countries become more advanced in growing crops in containers, and as more and more different (both new and traditional) crops around the world begin to be cultivated in places other than the field.

With increased demand and use comes increased interest by some to recycle or reuse their growing media, otherwise it has to be disposed of in some way. A practice that is as old as our current greenhouse industry, the reuse or repurposing of growing media has been met with rewards as well as some serious challenges by different individuals. While searching the scientific literature, trade magazines and online sources, I began to quickly realize the scope of what is known, not known or believed regarding the pros and cons of reusing growing media. The following terms occurred multiple times as I searched this topic:

reduce, reuse, recycle, reutilize, rehabilitate, reclaim, repurpose, restore, regrind, recondition, replace, reduce, reprocess, repeated, reapplied. I never knew there were so many synonyms for reuse! With this being stated, let's take a quick look at some of the various pros and cons of reusing organic growing media. The reuse of inorganic materials (rock/mineral wools, perlite, pumice, clay pebbles, etc.) deserves a separate and more thorough discussion of their own as they have potentials, reuses and issues much different than the organic materials.

First, some terminology. As is often the case, nomenclature of a topic can often be confusing and words or concepts used interchangeably when they should not be.

- **Sterilization** — the temporary destruction of most all living organisms including microorganisms, bacteria, fungi/spores, nematodes, insect eggs, weed seeds, etc. using heat of at least 212°F for at least 30 minutes.
- **Sterile** — free from most harmful pests or diseases commonly problematic for cultivated plants. Can be achieved without steaming/heating and does not eliminate all microorganisms/biology in the soil/substrate.
- **Sanitation** — a condition, situation or environment that is free of harmful pests.



Fig. 1. A common practice of in ground (mineral) soil cropping systems involves the solarization of soil planting beds, common for cut flower production, when (A) fallow soil (after a crop production cycle) is covered with (B) transparent polyethylene tarps and allowed to heat via the sun until sterile. Soil carts (C and D) are also often used for loose-fill soil and soilless substrates prior to use, or reuse in crop production.



Fig. 2. Nursery (and sometimes greenhouse/flower) operations often stock-pile (A and B) overs, rejects, damaged, and unsold plants and attempt to repurpose them by (C) grinding in a tub grinder (or like device) and (D) piling or windrowing the material for some period of time before being reused in future crop production.

- Solarization — the use of the sun's energy to heat soil/growing media that is covered in a transparent polyethylene tarp and allowed to heat to at least 160°F. This can be for short time, 30 minutes or over the course of weeks, depending on the setup and operation (**Fig. 1**).
- Pasteurization — a process of making something free from most forms of bacteria, microorganisms, diseases, weed seeds or other forms

of life. This is typically achieved with steaming to a temperature of about 180°F for 30 minutes.

Growing media can be essentially sterile without being sterilized or pasteurized. Peat moss for example, contains many natural beneficial microorganisms, therefore not technically sterile, but it typically contains none that are harmful to plants grown in the moss. Sterilizing peat moss would destroy the beneficial organisms, thereby reducing the quality of the peat. Also, by virtue of where peat originates, it is not prone to have weed seeds or contain insect eggs/larvae, or other potential pests that would harm horticultural crops. The same can be said of many of the commercialized wood fiber products currently on the market.

Many growers may not have the need to dispose of or recycle growing media if all of their crops are container-grown and shipped out or sold. An exception may be the need to dispose of unsold, damaged or poor quality plants that often get piled outside somewhere on the property. These “death piles” can be seen at many nurseries and greenhouse grower operations across the country (**Fig. 2**).

It is also important to note that even if recycled growing media (or soils) are sterilized to remove all potential pests, it does not mean that the materials will remain sterilized. Sterilization of any material is only a temporary state or condition. If pests or diseases are present in the potting or production area, they will be re-inoculated quickly.

Potential risks

Recycled growing media can have some detrimental properties that should be considered and monitored. First is the potential loss of physical properties of reused media. Over time, organic particles naturally break down (decompose), thereby decreasing structure and air porosity. If materials are ground up or otherwise handled during sterilization processes, the particle size will continue to reduce, therefore changing the physical properties when repotted. Blending in some percentage of new growing media with the old/reused would likely help with this problem.

A natural perlite replacement.

PBH Nature's Media Amendment is the perfectly natural replacement for perlite in your growing mix. Uniquely processed and parboiled to verify purity and cleanliness, this OMRI Listed® rice hull product from Riceland Foods, Inc. creates optimum porosity and drainage, while supporting sustainable plant production.

Real advantages.

- Lower basic cost than perlite
- Less dust than perlite when mixing
- Highly compressed standard bag or bulk bale reduces freight, labor, waste, storage



870-673-5575
www.riceland.com

PBH Nature's Media Amendment is also used as a container topdress to prevent weeds in the nursery environment. Always trial any material used in a new application for adaptability to your operation.





Fig. 3. Recycled organic substrate materials stored outdoors can often contain weed seeds (and pathogens) if not aged properly.

(Fig. 3) and or pathogens. Recycled materials not properly sterilized could contain *Pythium*, *Fusarium*, *Phytophthora* and other plant-sensitive diseases. The recent increase in legalized cannabis production has also exposed new biological concerns (many may be unfounded) including the presence of *E. coli* and *Salmonella* in growing media that are now being monitored and, in some cases, regulated for.

Lastly, there can be some toxicity effects from reused growing media. Mostly in the form of residual fertilizer salts that can create high EC in mixes when re-blended or reused in future crop productions. This can alter fertility practices and management as well as crop growth response and control. Desalinization via washing or flushing with hot water is needed to remove potential salts from materials like coco coir.



Fig. 4. Some greenhouse operations have implemented successful substrate recycling programs that include (A) grinding rootballs followed by steam sterilization of processed substrate. The steam heated processed substrate materials (B and C) can then be aged or stored until being incorporated back into the crop production cycle.

Potential rewards

If done properly and monitored, the reuse and recycling of growing media can save money for some growers if they are willing to invest the time and resources to properly do it. Growing media is often not cheap, so it is possible to save some money. Reuse of materials is also a great way to reduce the disposal of organic and inorganic materials, and make operations more sustainable and carbon-neutral. Some cut flower growers and others have the process of recycling their growing media down to a science and have been very successful for many years incorporating it into their growing systems (Fig. 4).

With all of the “re-” words listed in the beginning of this article to describe growing media, the one that should be considered and remembered most is re-spect! Your growing media is such a vital part of the success of your production system, be that large or small, professional or hobby market. If you reuse or recycle, do it right and understand the potential consequences. Cutting corners or trying to save a dollar may be worth it on some things, but do not jeopardize the quality and performance of your growing media! Your plants will thank you. GM

Secondly, reused growing media can house potentially harmful pathogens, pests and other unwanted goodies if not properly sterilized or treated. The infection or exposure that improperly

recycled materials can have on a grower operation can be very detrimental to future crops and cropping cycles. Recycled materials left outdoors can easily be contaminated with weed seeds

The author is an associate professor and director of the Horticultural Substrates Laboratory at North Carolina State University. He can be reached at Brian_Jackson@ncsu.edu