BIOCHAR IN COMPOST

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Improve compost and save money

Adding biochar activates the composting process by enhancing the activity of microorganisms, which raises the temperature, reduces composting time and speeds up stabilization of the compost.[1]

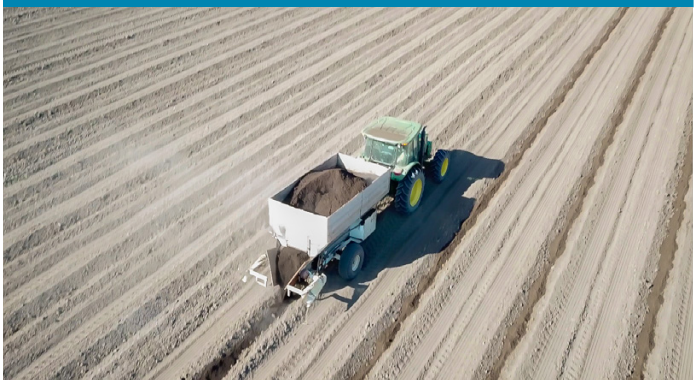
Research shows that that adding 5% to 10% by volume biochar at the start of the compost process can generate the following benefits:

- **Speed up the composting process by 20% through better aeration of the pile and increasing microbial activity[5]**
- **Capture odors[6]**
- **Generate a compost with higher nutrient because biochar retains nitrogen[7]**

The use of biochar during the compost process yields a product comparable to those obtained with mineral fertilizer additions with a lower environmental impact.[2]

More recently, researchers found that benefits of co-composting with biochar far outweighed any drawbacks or side-effects when compared with other amendments. The quality of biochar-compost improves soil health and can boost crop yields.[3]

How to use biochar in the composting process



To use biochar in the composting process, the material should be added just like any other composting ingredient using existing equipment.

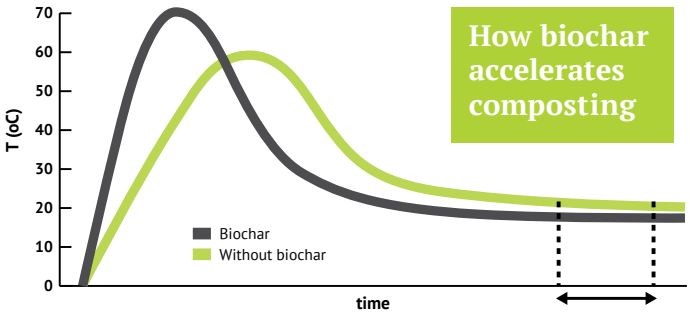
The scientific literature and experience of composters indicates that the best ratio of biochar to compost is in the range of 5% to 10% by volume. Adding more than 20% or 30% is not recommended as an excessive amount can interfere with biodegradation.[4]

Compost operators will realize these benefits

- **Accelerates compost process**
- **Reduces nutrient losses**
- **Reduces greenhouse gas emissions**
- **Acts as a bulking agent**
- **Increases microbial activity**
- **Reduces odor**

Economics

Increased production and savings: Composters who use biochar often see processing time reduced. More importantly, they report cost savings from turning piles less frequently. The fuel and labor savings is even more appealing than reducing compost time.



Biochar increases the temperature in the compost process, accelerating material decomposition

CASE HISTORY: REXIUS

CHALLENGE/OPPORTUNITY: Jack Hoeck is VP of Environmental Services at Rexius, a family-owned compost and soil producer in Oregon. Jack heard about the benefits of biochar through his conversations with John Miedema of BioLogical Carbon. He was intrigued by the material as a possible new amendment to help the company produce better compost.

SOLUTION/APPROACH: Rexius started out by creating two compost windrows, one with biochar and one without. In the windrow with 5% biochar by volume added, the compost-biochar had more moisture, nitrates and other nutrients than the pile without biochar. Overall, the quality was better in the biochar windrow.

RESULTS: Since starting to use biochar in the compost process, Rexius has continued to record higher nutrient values in their biochar-compost than compost without biochar. They also report higher beneficial plant bacteria and microbes compared to compost without biochar. Both the higher nutrients and more beneficial microbes create a higher value soil product that commands a better price for their home gardening potting and garden soils product lines.

Jordan Launch of Rexius said there are multiple benefits from incorporating biochar in their composting process. The two main ones are the labor and fuel savings from not having to turn the compost pile as often. That's in addition to having a higher value product at the end of the process. Biochar helps stabilize the soil whereas compost alone can degrade relatively quickly. Investing in adding biochar and biochar compost to soil offers long term benefits.

CONCLUSION: As Jordan mentioned, "The better your soil, the more productive your garden will be (whether that is better tomatoes, more colorful and vibrant flowers, or higher yields of lettuce or kale). Biochar and biochar-compost helps improve soil. Though the material costs more, it results in greater yields and makes it well worth the investment."

CASE HISTORY: PACIFIC BIOCHAR

CHALLENGE/OPPORTUNITY: The Oasis Vineyard located outside of King City, CA. was interested in trying different amendments to study how biochar and compost treatments effect soil water use, soil health, vine growth, harvest yields and grape quality.

The Oasis Vineyard had soils with low organic matter. In addition, the vineyard needed to conserve more water. Because biochar and compost can build soil organic matter and help retain moisture, the vineyard wanted to use them in a field trial.

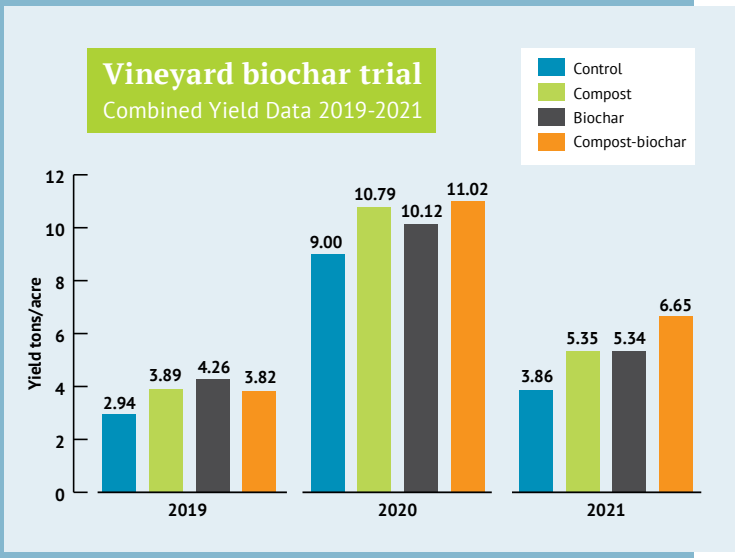
SOLUTION/APPROACH: Starting in 2016, the Sonoma Ecology Center, UC Riverside and Pacific Biochar worked with the Oasis Vineyard manager Monterey Pacific Inc. to develop a multi-year field trial with funding from the California Department of Water Resources. Treatments included biochar only, compost only, biochar-compost, and a control (no amendment).

New plantings of vines were prepared by ripping rows in the soil to a 30 inch depth, 2 feet wide by 2.5 feet deep (approximately 25 cubic feet of soil per vine). Biochar was applied in the planting row at 10 tons per acre wet weight, and compost was applied at 15 tons per acre wet weight.

RESULTS

Some of the reported findings include:

- The highest yield came from the biochar-compost treatment resulting in a 45% increase over the control.
- Increased pruning weight was observed for both the compost and the compost + biochar treatment. Higher cluster counts were observed for both the biochar and the compost + biochar treatments.
- All treatments received the same irrigation regimen throughout the trial, demonstrating improved water use efficiency where soil had been amended.



CONCLUSION: Results from the field research trial indicate that biochar and compost treatments can improve water use efficiency, vine growth, harvest yields and soil health for vineyards newly planted on low organic matter sandy soil.

The vineyard manager, Monterey Pacific, said the return on investment for adding biochar paid off in the first grape harvest with higher profit expected over the life of the vines.[8]

(Economics continued)

Higher quality material: Increased nitrogen in the final product gives biochar-compost a better nutrient profile than compost alone, making for a better soil amendment.

Interested in learning more about the economics of biochar? See the Biochar Atlas-Cost Benefit Analysis tool, which guides users to assess whether biochar is a good investment for your soil. **pnwbiochar.org/tools/cba**

Non-economic benefits

Biochar is made from a variety of biogenic biomass sources (leaves, wood chips, agricultural residues, orchard pruning, vineyard cuttings, and many others). As a biogenic resource, biochar feedstocks are natural and renewable.

Many locations across the United States have excess biomass with little or no market value. These materials are often either burned or sent to a landfill. Compost companies provide a valuable mechanism to divert large-scale waste

biomass resources and make them into something that can help improve soils. Biochar is a new product made from low-value material that can help add value to compost.

In so many communities, excess biomass shows up at landfills for disposal. Every fall, when the leaves drop, the level of waste biomass that gets sent to the landfill is disturbing. This is also true for the debris from a strong windstorm or ice storm event. If we can develop new markets for low-value biomass (like biochar), we are helping to create natural, renewable, locally produced material that can benefit people and the environment.

Some tips for using biochar

- **Biochar compost products can be spread using the same type of equipment farmers use to spread compost.** It can either be worked into the soil using a plow or side-casting along rows, as in the case of biochar-compost vineyard applications
- **The amount of biochar-compost that you should apply to your soil will depend on a variety of factors**
- **To learn more about how biochar can help your soil, please view the Biochar Atlas pnwbiochar.org/tools**
- **The Biochar Selector tool can guide you on the amount of biochar for your soil. pnwbiochar.org/tools/selector**

Reference Guide

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