

## **PERSIST® BIOCHAR** **TECHNICAL DATA SHEET**

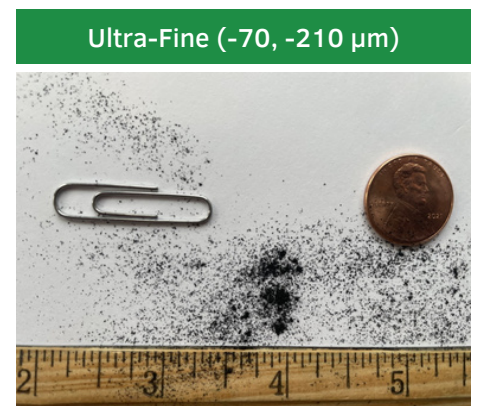
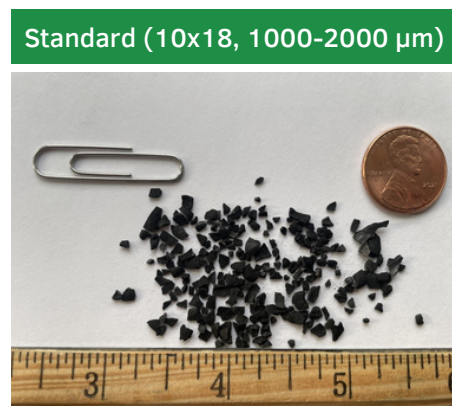
### **1) PRODUCT DESCRIPTION:**

Persist® Biochar is produced in California from 100% pistachio shells using VGrid's proprietary clean energy process. VGrid's high-temperature gasification system produces biochar with superior porosity and purity. Persist Biochar is post-processed into specific particle sizes for ease of application:

<i>Whole Shell</i>	<i>Unprocessed:</i>	Approximately 250 lbs per cubic yard
<i>Large Granular</i>	<i>+10 Mesh (&gt; 2 mm):</i>	Approximately 400 lbs per cubic yard
<i>Standard Granular</i>	<i>10x18 Mesh (1-2 mm):</i>	Approximately 500 lbs per cubic yard
<i>Fine Particle</i>	<i>18x70 Mesh (0.2-1 mm):</i>	Approximately 625 lbs per cubic yard
<i>Ultra-Fine</i>	<i>-70 Mesh (&lt; 0.2 mm):</i>	Approximately 740 lbs per cubic yard
<i>Micronized</i>	<i>-325 Mesh (&lt;0.044 mm):</i>	Approximately 760 lbs per cubic yard

Custom sizing is also available. Persist **Micronized** Biochar (-325 mesh) is a dry powder intended for liquid applications. See below for examples of select particle sizes.

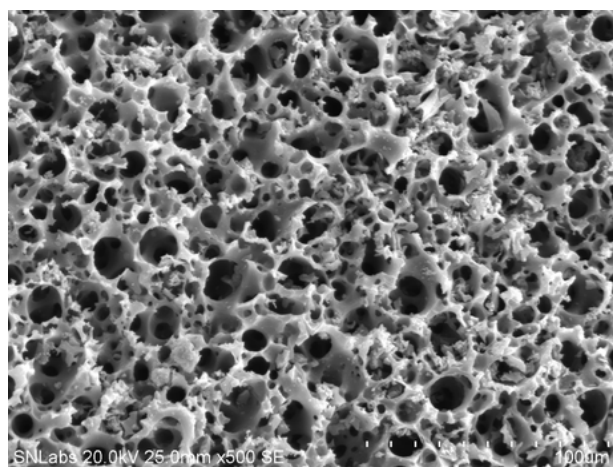
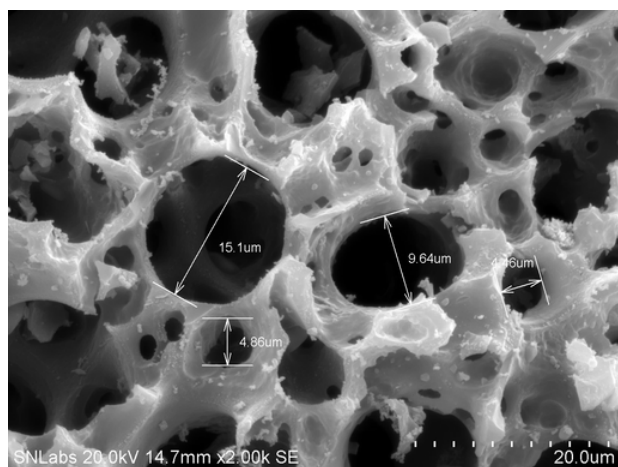
Persist Biochar is available in 2.0 cubic yard super sacks, 1.5 cubic foot large bags, and 3 quart small bags. A single pallet can fit 2 super sacks or 40 large bags. Contact VGrid for bulk pricing/shipping.



## 2) BENEFITS:

In addition to Persist Biochar's role in providing durable carbon removal and reversing climate change, it helps restore the natural productivity of the soil. In third-party trials, Persist Biochar has been shown to improve crop yields while requiring less water and fertilizer. Persist Biochar has an exceptionally large 'surface area-to-volume ratio' (BET). Each gram has an average surface area of over 300 square meters. See SEM images below highlighting Persist Biochar's porosity.

- Carbon Sequestration: Removes 2.5 times its weight in CO<sub>2</sub>, helping to reverse climate change.
- Water Savings: Soils amended with Persist biochar improve moisture retention by 23%\*.
- Nutrient Availability: Nutrients are held in the pore network longer rather than leaching away.
- Microbial Enhancement: Provides a structure for microbial colonization in soil.
- Contaminant Filtration: The macro, micro, and nanopores trap and hold contaminants.
- Soil pH Buffering: Helps soil resist significant changes in pH levels.
- Cation Exchange Capacity: Increases CEC, the ability of soil to retain plant nutrients.



## 3) CERTIFICATIONS AND APPROVALS:



\* Lobato, M., Nelson, G., & Stanley, H. (2023, August). Biochar Research Trial at Lobato Farms, Colorado State University. Unpublished raw data.

#### 4) PRODUCT SPECIFICATIONS:

Carbon: 88.0% (dry weight basis)

Hydrogen: 1.7% (dry weight basis)

Nitrogen: 1.1% (dry weight basis)

Oxygen: 2.9% (dry weight basis)

Ash: 6.2% (dry weight basis)

Moisture: Varies by particle size

Bulk Density: Varies by particle size

pH Value: 8.83

Volatile Matter: 11.5%

Surface Area (BET): ~300 m<sup>2</sup>/g

*The above specifications are averages and do not represent a guaranteed analysis. Select terms and conditions may apply. Please contact VGrid for a copy of complete third-party laboratory analysis.*

#### 5) INSTRUCTIONS FOR USE:

##### **Add Persist Biochar to the Soil Together with Your Preferred Nutrient Regimen:**

Although not required, VGrid recommends applying biochar and nutrients together (composts, fertilizers, and/or biologicals). Since some nutrients are absorbed into the biochar after the initial application, it is possible the biochar will temporarily reduce nutrient availability to plants.

**Retail customers:** Please follow the instructions below and contact VGrid if additional guidance is needed.

**Commercial customers:** Please contact VGrid to review specific application instructions.

##### **General horticulture and garden use:**

Prepare soil by spreading 2 large bags (60 lbs) of Persist Biochar over 1,000 sq ft (approximately two inches deep). Till, rake, or hand mix into the soil. For initial watering, thoroughly saturate the biochar and soil. For additional waterings, please check soil moisture and lightly water as needed.

##### **Planters, landscape beds, and nursery pots:**

Mix 1 part Persist Biochar with 6-10 parts soil, then water. For initial watering, thoroughly saturate the biochar and soil. For additional watering, check soil moisture and lightly water as needed.

##### **Composting:**

Mix 1 part biochar with 5-6 parts compost. Persist Biochar has been shown to improve microbial activity in compost piles and help reduce Nitrogen loss (among other benefits). The compost-biochar blend can then be added to the soil (1 part blend added to 1 to 4 parts soil for best results).

## Pre-lawn planting or sod laying:

Soil Preparation: Mix 75 lbs (2.5 large bags) of Persist Biochar over 1,000 sq ft of tilled ground and rake biochar into the soil. Roll or flatten soil and lay sod or plant seeds. For best results, after seeding or laying down sod, lightly sprinkle biochar over the entire area (approximately 10 lbs sprinkled over a 1,000 sq ft area).

Watering: Before seeding or laying sod, moderately saturate the biochar and soil, and let stand until the water soaks in. After sprinkling Persist Biochar over the sod or planted area, water lightly to dampen and then water only as needed.

## 6) CARE AND HANDLING:

**Refer to the Persist Biochar MSDS for required safety and handling information:**

<https://persistproducts.com/product-documentation/>



**CAUTION:** Skin Irritant - Wear gloves when handling. Allergic reactions may occur in people sensitive to organic and mineral dust or have sensitive skin. A black powder can be deposited on the skin if light contact is made.



**CAUTION:** Eye Irritant - Wear goggles or take other precautions to prevent airborne dust from entering the eyes are necessary. If in the eyes, rinse cautiously with water for several minutes.



**CAUTION:** Respiratory Irritant - Use outside or in a well-ventilated area only. Wear a mask or other appropriate breathing protection to avoid inhalation of biochar particles. An N95 or equivalent mask is recommended.



**DANGER:** Combustion and Explosion Risk - Flammable solids, Category 1 combustible dust. Ensure biochar and airborne biochar particles do not come in contact with a spark or flame. Use outside or in a well-ventilated area only with a code-compliant fire protection system. **Risk of serious injury or death.**

## 7) AVAILABILITY:

Retail customers can purchase Persist Biochar online at [www.persistproducts.com](http://www.persistproducts.com) or through third-party online retailers including Amazon, Wal-Mart, and Lowe's. Bulk orders can be placed directly by contacting VGrid Energy Systems at the following:

Address: 513 Calle San Pablo, Camarillo, CA 93012 --- Website: [www.persistproducts.com](http://www.persistproducts.com)

Email: [info@vgridenergysystems.com](mailto:info@vgridenergysystems.com) --- Phone: (805) 482-9040