coolterra ORGANIC

featuring ENGINEERED BIOCARBON technology

Innovating to Change the World for Good
Biochar is the carbon skeleton left over from biomass

BIOMASS → PYROLYSIS → BIOCHAR

High Heat (300-800+ C) without Oxygen

Biomass selection, pyrolysis conditions, and other factors impact the quality of biochar
Historically, biochar has been inconsistent, due to lack of understanding of key properties and production process.

**Key physical and chemical properties**

- High pH levels
- High phytotoxic concentration
- Low pore capacity
- Low process control

Can lead to inconsistent results:

- Degraded elements of soil health
- Decreased production and plant quality

Biochar as co-produced with hydrocarbons

Raw biochar
Soil carbon comes in many forms and each play an important role. Soil carbon is a key component of soil health.

Labile:
- Compost and manure
- Nutrient rich
- Highly degradable
- Short-lived

Humic:
- Humus
- Humic / fluvic acids
- Complex organic compounds
- Degradable

Recalcitrant:
- Mostly pyrogenic
- Structural
- Fixed Carbon
- Long-lasting (100+ years)

These three types of carbon can complement each other.
Recalcitrant fixed carbon has the potential to address a range of soil issues...

Features & Benefits of recalcitrant carbon

1. Adsorptive and Desorptive
   - Holds water
   - Retains nutrients

2. Porous
   - Anchors micro-roots
   - Promotes microbial growth as “habitat”

3. Structure
   - Pathway for water and oxygen
   - Aeration in clay soils
   - Structure in sandy soils

4. Chemically stable
   - Durable, 100+ yr degradation cycle
   - Sequesters carbon

Cool Terra Structure under a scanning electron microscope
Modern science and engineering applied to biochar to harness the good and eliminate the bad

<table>
<thead>
<tr>
<th>Predictable characteristics and performance</th>
<th>High variability</th>
</tr>
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<tbody>
<tr>
<td>Processed to eliminate compounds</td>
<td></td>
</tr>
<tr>
<td>which negatively impact plant growth</td>
<td>Potentially contains phytotoxins or other problematic compounds (dioxins)</td>
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<tr>
<td><strong>Hydrophillic</strong>: Ready-to-use immediately</td>
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<tr>
<td>Low dust, higher crush strength</td>
<td>High dust content, low crush strength</td>
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<tr>
<td>Designed to flow through most common</td>
<td></td>
</tr>
<tr>
<td>application equipment</td>
<td>Difficult to apply: flowability issues / large variability in particle sizes</td>
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<tr>
<td>Low application rates</td>
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<tr>
<td></td>
<td>High application rates</td>
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Proprietary process transforms biochar into a consistent, durable, and stable soil revitalizer
Cool Terra works to optimize the soil through physical, chemical, and biological mechanisms:

### PHYSICAL

**ENHANCE SOIL STRUCTURE**
- High porosity benefits water and nutrient holding
- Expansive surface area creates free air space in heavy soil and can improve infiltration
- Water holding capacity improves plant available water and reduces evaporative loss in highly evaporative soils

### CHEMICAL

**ENHANCE NUTRIENT EFFICIENCY**
- High ion (CEC and AEC) exchange capacity can promote nutrient exchange and availability – holding nutrients in the root zone longer
- Porous structure of recalcitrant carbon can delay leaching – giving plants more time to use nutrients

### BIOLOGICAL

**ENHANCE MICROBIAL ACTIVITY**
- Strong and durable cell walls enhance the structural habitat for microbes
- Neutral pH provides optimal microbial environment
- Pore-size distribution benefits microbial populations
Results from 100+ independent field trials have shown consistent yield increases.

**Trial Results**

**Improvement in marketable yield (%) Cool Terra vs. control**

- **KS: 8% Increase**
  - Corn bushels / acre
  - 1 year ROI: 4x

- **OR: 15% Increase**
  - Wheat lbs / acre
  - 1 year ROI: 5x

- **FL: 9.2% Increase**
  - Tomato lbs / acre
  - 1 year ROI: 5.1x

- **CA: 42% Increase**
  - Strawberry flats / acre
  - 1 year ROI: 18x

- **OR: 35% Increase**
  - Potato lbs / acre
  - 1 year ROI: 4.9x

Includes results from 90 field trials that produced data on marketable yield for treated vs. grower standard control in 2016 and 2017.

- Individual 3rd party field trial

Trials have shown average yield increase of ~12% with greater than 3:1 grower ROI.
Cool Terra: Profitability AND Sustainability

- Feeding more people...
  - Higher crop yield

- ...with higher grower profitability...
  - More production. Optimized inputs

- ...and a healthier planet
  - Improved soil health | less fertilizer leaching
  - Carbon sequestration | Detoxified soil

- Optimizes water holding in soil
- Increases nutrient efficiency
- Nurtures microbial growth
- Impacts germination and establishment
- Sequesters carbon
  - 1 ton CT = 2.7 tons CO2 removed from atmosphere

OMRI LISTED
For Organic Use

Cool Terra - Profitability AND Sustainability
Cool Terra is produced with 100% biobased biochar