

## BIOCHAR EMBEDED101

### 1. Description

This product is a 100% natural biochar derived from olive pits originated from certified organic olive groves (ISANATUR SPAIN) and obtained through slow pyrolysis under oxygen-free conditions.

### 2. Applications

This product is recommended for the care of all types of plant species, making it an ecological solution for improving both soils and composting processes. Its main features include enhancing soil fertility and moisture retention, providing benefits such as:

- Improved soil quality, resulting in higher crop quality and productivity.
- Reduced need for fertilizers, as it helps retain soil nutrients, thereby lowering the amount of fertilizer required to maintain soil fertility.
- Contribution to carbon sequestration and reduced environmental footprint.
- Mitigation of soil toxicity, including heavy metals and toxic organic compounds.
- Reduced nutrient leaching caused by rainfall or irrigation, leading to greater nutrient-use efficiency.
- Increased drought resistance, as it helps retain water in the soil.
- Reduction of organic and inorganic contaminants in water.
- Soil pH regulation, thanks to its neutralizing effect on soil acidity, helping maintain optimal pH conditions for crop growth.
- Enhanced soil biology. The high surface area and pore structure of biochar provide a habitat for soil microorganisms, including nitrogen-fixing bacteria and beneficial fungi, which in turn can increase nutrient availability for crops.
- High product quality. The production process and the quality of the raw materials used to produce BC101 ensure a premium biochar free of toxic elements.

### 3. Specifications

#### a. Physicochemical properties

Physicochemical properties		
Parameters	Unity	Results
pH	-	7,9
Bulk density	g/ml	0,56
Water holding capacity	ml/ g char	0,86
Particle size	mm	Ø 2-4 x 10-15
Moisture	%	13,7
Ash content	%	2,7
Equivalent surface area	m <sup>2</sup> /g	<250
Product yield	% (m/m)	30,4

#### b. CHONS composition

CHONS composition		
Parameters	Unity	Results
Total Carbon	% (w/w)	75,3
Organic C	% (w/w)	74,7
Hydrogen	% (w/w)	4,1
Total Nitrogen	% (w/w)	1,59
Oxygen	% (w/w)	16,4
Total Sulphur (S)	%(w/w)	0,07
Fulvic acids	% DM	2,79
Humic acids	% DM	4,49
H/C ratio	-	0,64
H/Corg ratio	-	0,65
O/C ratio	-	0,164
C/N ratio (w)	-	47,3

### c. Macronutrients

Macronutrients		
Parameters	Unity	Results
P (P <sub>2</sub> O <sub>5</sub> )	g/kg	4,8
K (K <sub>2</sub> O)	g/kg	6,0
Ca (CaO)	g/kg	8,6
Mg (MgO)	g/kg	2,2
Na (N <sub>2</sub> aO)	g/kg	0,3
Iron (Fe)	g/kg	0,3
Silicon (Si)	g/kg	0,6

### d. Main trace metals

Main trace metals		
Parameters	Unity	Results
Arsenic (As)	ppm mg/kg	1,2
Lead (Pb)	ppm mg/kg	<2
Cadmium (Cd)	ppm mg/kg	<0,2
Copper (Cu)	ppm mg/kg	21
Nickel (Ni)	ppm mg/kg	21
Mercury (Hg)	ppm mg/kg	0,3
Zinc (Zn)	ppm mg/kg	46
Chromium (Cr)	ppm mg/kg	37
Boron (B)	ppm mg/kg	37
Manganese (Mn)	ppm mg/kg	40
Silver (Ag)	ppm mg/kg	<5

### e. Polycyclic Aromatic Hydrocarbons (PAHs)

PAHs		
Parameters	Number of aromatic rings	Concentration (ppm)
Naphthalene (m/z 128)	2	<0,1
Phenanthrene (m/z 178)	3	<0,1
Fluoranthene (m/z 202)	4	<0,1
Pyrene (m/z 202)	4	<0,1
Chrysene (m/z 228)	4	<0,1

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#### 4. Safety considerations

EMBEDED101 is a safe product, but is advisable to:

- P102 – Keep out of reach of children.
- P261 – Avoid raising dust, as it may cause irritation. It is recommended to slightly moisten the product before handling.
- P412 – Do not expose to fire or heat sources above 50°C.
- P270 – Do not eat, drink or smoke while using this product.

#### 5. Logistics and availability

The EMBEDED project shall make available up to 1,000 kg of Biochar EMBEDED101 to the selected sub-projects, to be allocated in descending order of evaluation score until the available stock is fully exhausted.

The biochar is stored in Puente la Reina, Navarra, Spain. All costs, responsibilities, and arrangements related to the collection, handling, transportation, and delivery of the biochar from the storage location to the sub-grantees' premises shall be borne exclusively by the sub-grantees.

The biochar shall be supplied in either 50-litre bags or 500-litre big bags, subject to availability. Sub-grantees shall provide written notice to the EMBEDED project at least one (1) month in advance of the intended collection date. The EMBEDED project shall not be held liable for any delays or inability to supply the material where such notice is not duly provided.

**Transfer of Risk.** The risk of loss of or damage to the biochar shall transfer to the sub-grantee at the moment the material is made available for collection at the storage location. From that point onwards, the sub-grantee shall bear all risks and liabilities associated with the handling, loading, transport, storage, and use of the biochar, including any loss, damage, or deterioration of the material, regardless of the cause, except in cases of wilful misconduct or gross negligence attributable to the EMBEDED project.

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## **6. Liability Waiver**

To the maximum extent permitted by applicable law, the sub-grantees acknowledge and agree that the biochar is provided “as is” and without any express or implied warranties, including but not limited to warranties of merchantability or fitness for a particular purpose. The EMBEDDED project shall not be liable for any direct, indirect, incidental, consequential, or special damages arising out of or in connection with the use, handling, transport, storage, or application of the biochar by the sub-grantees or any third party. The sub-grantees shall assume full responsibility for ensuring that the use of the biochar complies with all applicable laws, regulations, and safety requirements, and shall indemnify and hold harmless the EMBEDDED project against any claims, damages, or liabilities arising from such use.