

Practice BBF n° 14

BIOCHAR: INNOVATIONS THROUGH CARBONIZATIONS TESTED IN AMIATA AND MAREMMA

Introduction

Category: Good Practice (GP)

Practice identity card

#Bio-based fertilizers, food, GP, The Netherlands, biochar, soil fertility

#Biochar, produced of organic biomass, is used to improve soil health and add carbon to the soil

It enhances soil fertility by increasing water retention, stimulating soil life, and binding nutrients to reduce leaching

Biochar can be produced from forestry, agro-forestry, and olive-growing residues, turning waste into a valuable resource

Short description

- ➔ Biochar is a carbon-rich material produced by pyrolysis, which is the thermal decomposition in the absence of oxygen. This usually occurs in organic biomass, such as wood, agricultural residues, or other plant materials. It is primarily used as a soil amendment to improve soil health and sequester carbon. Biochar is usually applied during soil preparation and is either before or after seeding incorporated in the soil. It can be applied in combination with an organic fertilizer, like compost or slurry.
- ➔ By adding biochar to a soil, the carbon content is increased which contributes to the overall soil fertility. Specifically, the addition of biochar increases the water holding capacity of the soil. Next to that, it is a stimulus for soil life and can reduce the leaching by binding nutrients.
- ➔ The biochar can be produced of many carbon rich products. In this project the experimentation was conducted on biochar obtained from the combination of forestry, agro-forestry, olive-growing, and agriculture. In particular, the aim is to reduce the waste out of olive pruning. This is particularly interesting from a circular economy perspective which, through vegetal the production of biochar, transforms what was previously a problem into a resource.



Implementation process

Which fertiliser type is considered as the standard in this region? It depends on the cultivation and it may be chemical or organic

What was the on-farm issue/challenge/opportunity that led to the implementation of the practice? Valorize waste and processing residues with less impact than other forms of disposal and at the same time generate energy and increase in the fertility of the "soil system".

How long did it take to implement the practice and which are the measures needed to monitor: 29 Months

Application process/mode

- **In which form is the BBF applied?** solid
- **How is the BBF applied on the field?** broadcasting

Logistics

- **Storage safety risk:** low
- **Logistic aspects to consider:** A decrease in the negative externalities of carbonization; an increase in the fertility of the "soil system"; a diversification of the forestry and agro-forestry supply chains; prototyping and development of a vertical mobile furnace with discontinuous operation capable of processing (carbonizing) ligno-cellulosic material of variable small-medium size; tests regarding possible future developments on a type of experimental small-sized pyrolytic boiler capable of operating as a pyro-gasifier for the production of syngas (i.e. flare flame) and coal; optimization, qualification and standardization of the production of biochar obtained from forestry and agricultural systems: selection of materials and mechanical preparation treatments; optimization of pyrolysis; development of mixing and packaging; monitoring of the effect of the addition of biochar on the fertility of the soil system in terms of microbiological indicators and formulation of innovative natural cosmetic/cosmeceutical lines; creation of a local synergy between the actors of the supply chain, capable of addressing the problem and attempting scientifically supported solutions.
- **Skill/education level required for safe and effective application of the BBF?** rather low
- **Availability of the BBF in this region:** sufficiently available
- **Availability of the BBF in the wider EU:** sufficiently available

Agronomical traits

- **Is it a 'slow-release' fertiliser?** yes
- **C:N ratio of the BBF:** Unknown: Biochar is mainly used to maintain soil fertility
- **All materials present in the BBF:** agricultural residues
- **Can the BBF be applied to a multitude of cultivation techniques, or is the use limited to one or a few techniques?** Yes, biochar on the fertility of the soil system in terms of microbiological indicators, and field evaluation in nursery, horticultural and agronomic activities; Possibility of creating a new supply chain in the territories with the involvement of new comp
- **Targeted crop categories:** food, feed, fibre, oil, ornamental, industrial
- **Influence on soil quality:** Yes, a decrease in the negative externalities of carbonization; an

increase in the fertility of the "soil system".

- **Soil types suitable for the BBF:** peaty, sandy, clay, loamy, chalky, silty
- **Expected effect on crop yield:** increase
- **Expected effect on crop yield variation:** increase
- **Expected effect on crop quality:** increase
- **Expected effect on crop quality variation:** increase
- **Which costs may increase upon using the BBF?** equipment
- **Which costs may decrease upon using the BBF?** mineral or other types of fertilisers, herbicides, pesticides
- **Expected long-term/indirect benefits of using the BBF:** Yes, Positive effect of the addition of different types of biochar on the fertility of the soil system in terms of microbiological indicators, and field evaluation in nursery, horticultural and agronomic activities, with a clear decrease in terms of water and fertilizer use with economic advantages connected to their lower consumption.
- **Is the use as fertiliser the most valuable application of the material at hand?** Yes

Administrative context

- **Does the use of the BBF qualify for subsidies?** Yes, with RDP and other subsidies dedicated to sustainability
- **Status of the legal framework that regulates the use of the BBF:** well-developed
- **Are there any policy barriers complicating the use of the BBF?** None
- **Does the BBF contain any hazardous substances, and if this is the case, which one(s)?** None
- **Is the use of the BBF compliant with EU organic farming practices?** Yes
- **Is the use of the BBF supported by Eco-schemes?** we do not have ecoscheme for this activity
- **Expected effect on the leaching of nutrients?**
No leaching effect
- **Are there any gaseous emissions to be considered upon using the BBF?** No
- **Greenhouse gas (GHG) reduction potential of the BBF:** little or none
- **Effects expected on the time occupation of the farmer upon using the BBF?** moderate increase
- **May the use of the BBF contribute to a better public image of agriculture?** Yes

Contact

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Find out more

Source of information: <https://www.bioactam.it/>