

Prospects for the use of biochar in Italian farms: the case study of Molise

Claudia Coccozza, Dalila Trupiano, Carla Amendola, Roberto Tognetti, and Stefania Scippa

Dipartimento di Bioscienze e Territorio, Università del Molise, Pesche, Italy

Biochar is an innovative product that might be useful in agroforestry due to beneficial effects on soil health, carbon storage, plant growth and yield. The scientific discussion is focused on the need for a fuller definition which takes into account sustainability factors, such as: the use of biomass (e.g., organic wastes, sustainably managed residues, residue typology), production processes (e.g., processes that do not create net increases in greenhouse gas emissions or environmental pollutants), and end-use (e.g., do not add contaminants to the soil or harm human health). This study, by using an integrated approach, is aimed to show biochar properties arisen from different factors including feedstock origins and production patterns. In particular research activities will be aimed to investigate the effects of biochar obtained from olive and vineyard pruning and sheep manure on crop and forestry species. Biochar produced from farmer feedstock will be first characterized and then used to assess benefits in terms of: 1 - reducing requirements of conventional fertilizers; 2 - increasing crop yields by addressing constraints to growth (e.g. poor soil structure, low pH etc.); 3 - increasing the quality of the crop by addressing constraints (e.g., poor nutrient uptake resulting in low protein content); 4 - improving the physical properties of the soil or growing media. In open field, trials will be conducted to verify the organic fertilizer potential of biochar on *Olea europea* and *Vitis vinifera* plants. Moreover, the effects of biochar in improving physical-chemical characteristics and biological soil properties will be also assessed. Trials will be also conducted in pots under controlled conditions (greenhouse) and analysis will be focused on the evaluation of the effects of biochar on plant growth, development, yield and physiology. The main output of this pilot study is the definition of sustainable solutions at farm level in terms of: biomass for feedstock, production system, quality of produced biochar, application method of biochar, impact of biochar once applied. The research will be developed to highlight the viability of biochar production in farm context encouraging sustainable use of large quantities of feedstock, through small systems with localized and modulated energy production.