

Production and use of co-composted biochar as soil amendment for Cannabis sativa sp. growth



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INTRODUCTION

Biochar is a carbonaceous by-product of thermochemical conversion of lignocellulosic biomass. Its application to soil positively influences various soil physicochemical properties. Biochar high specific surface area and high micro and macro porosity raise the soil water retention and nutrients absorptivity from the soil, enhancing biomass yield. However, biochar itself contains low nutrients amount and its amendment properties could be improved through organic matter addition, rich in microelements and nutrients.

This work studies the integration of fresh organic matter and biochar in order to investigate co-composted biochar (hereby called COMBI) effects on soil amelioration and plant biomass production compared to biochar only.

biochar

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AIMS OF THE STUDY

 \rightarrow To investigate the co-composting process between organic waste and biochar;

 \rightarrow To test COMBI's effects on **Cannabis sativa sp.** growth, analyzing plants and flowers biomass, total content of cannabidiol (CBD) and tetrahydrocannabinol (THC).

MATERIALS & METHODS



wood pellets

THC and CBD content analysis: HPLC-UV: Agilent 1260 Infinity



through ALL Power Labs Power Pallet PP30 cogenerating thermal and electrical power

CREA Institute in Anzola (Bologna) hemp fields



organic waste

LC System

Greenhouse with HPS lamps for plant growth. 60 day vegetative phase 60 days flowering phase

	10%	20%	5%
CNTRL	COMBI	COMBI	BIOCHAR
	v/v	v/v	v/v

3 thesis invastigated, 8 plants each thesis

COMBI

CO-COMPOSTING maturation process into tumbler

(compost 75% v/v + biochar 15% v/v): 4 weeks

(co-composted biochar) used as Cannabis s. amendment

RESULTS





Figure A: Temperature profile during co-composting process with biochar and hemp organic waste into tumbler.

Figure B: RH% and C/N profile during co-composting maturation process

on Biochar 5%.

COMBI 10% and COMBI 20% increased 22% and 37% respectively flower biomass production compared with flower biomass grown on Biochar 5%

Figure D-E: total CBD and total THC contents into flowers biomass. Both COMBI 10 % and COMBI 20% show a significative increase of THC and CBD production compared with CNTRL and Biochar 5%, without overcoming law thresholds (0.6%)

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