

Biochar improves the properties of poultry manure compost as growing media for rosemary production

Fernando Fornes ^{1,*}, Luisa Liu-Xu ², Antonio Lidón ³, María Sánchez-García ⁴, María Luz Cayuela ⁴, Miguel A. Sánchez-Monedero ⁴ and Rosa María Belda ¹

¹ Instituto Agroforestal Mediterráneo, Universitat Politècnica de València, 46022 Valencia, Spain; ffornes@bvg.upv.es

² Departamento de Ciencias Agrárias y del Medio Natural, Grupo de Bioquímica y Biotecnología, Universitat Jaume I, Castellón de La Plana 12071, Spain; lliu@uji.es

³ Instituto Universitario de Ingeniería del Agua y del Medio Ambiente, Universitat Politècnica de València, 46022 Valencia, Spain; alidon@qim.upv.es

⁴ Department of Soil and Water Conservation and Organic Waste Management, CEBAS-CSIC, P.O. Box 4195, 30080 Murcia, Spain; msgarcia@cebas.csic.es; mlcayuela@cebas.csic.es; monedero@cebas.csic.es

* Correspondence: ffornes@bvg.upv.es; Tel.: (optional; include country code; if there are multiple corresponding authors, add author initials) +34-963877413

Received: date; Accepted: date; Published: date

Table S1. Chlorophyll and nutrient concentrations in shoots of *Rosmarinus officinalis* as affected by the proportions of poultry manure composted without biochar (PMC), poultry manure composted with biochar (PMBC), and peat (P) in the growth media. Main effects and statistical significance according to factorial analysis of variance. Three replicates (n=3) were used for each substrate and ratio.

	Ratios	Chlorophyll	N	P	K	Ca	Mg
Substrate	(% v:v)	(mg g ⁻¹ f.w.)	(% d.w.)	(% d.w.)	(% d.w.)	(% d.w.)	(% d.w.)
PMC:P	50:50	125ab	1.58c	0.41bc	3.75b	0.75ab	0.57a
	25:75	154a	1.70abc	0.56a	3.98ab	0.78ab	0.35b
	0:100	160a	1.85ab	0.13d	1.20c	0.82ab	0.39b
PMBC:P	50:50	97b	1.76abc	0.40c	3.90b	0.74ab	0.60a
	25:75	128ab	1.63bc	0.50ab	4.26a	0.58b	0.37b
	0:100	159a	1.88a	0.15d	1.23c	0.85a	0.37b
Main effects							
Material	PMC	146A	1.71A	0.37A	2.98B	0.78A	0.44A
	PMBC	128B	1.76A	0.35A	3.13A	0.72A	0.45A
Ratio	50:50	111B	1.67B	0.41B	3.83B	0.75AB	0.59A
	25:75	141A	1.66B	0.53A	4.12A	0.68B	0.36B
	0:100	160A	1.87A	0.14C	1.22C	0.84A	0.38B
Significance							
Material		*	Ns	Ns	*	Ns	Ns
Ratio		***	**	***	***	*	***
M x R		Ns	Ns	Ns	Ns	Ns	Ns

Ns, *, **, *** indicate not significant, statistically significant differences at $P \leq 0.05$, $P \leq 0.01$, $P \leq 0.001$, respectively. Values in the same column with different letters differ at $P \leq 0.05$ (Tukey test).

Table S2. Chlorophyll and nutrient concentrations in shoots of *Rosmarinus officinalis* as affected by the proportions of poultry manure compost (PMC), peat (P) and biochar (B) in the growth media. Main effects and statistical significance according to factorial analysis of variance. Three replicates (n=3) were used for each substrate and ratio.

Substrate	Ratios (% v:v)	Chlorophyll (mg g ⁻¹ f.w.)	N (% d.w.)	P (% d.w.)	K (% d.w.)	Ca (% d.w.)	Mg (% d.w.)
PMC:P	50:50	118c	1.65b	0.43b	3.71a	0.77b	0.59b
	25:75	152ab	1.75ab	0.59a	3.94a	0.81b	0.36c
	0:100	163ab	1.89a	0.14d	1.21d	0.83b	0.39c
PMC:B	50:50	140bc	1.87a	0.22c	2.61b	0.86b	0.78a
	25:75	167a	1.86a	0.19c	2.80b	0.73b	0.64b
	0:100	159ab	1.61b	0.10d	1.64c	1.15a	0.57b
Main effects							
Material	P	144B	1.76A	0.38A	2.95A	0.80B	0.44B
	B	155A	1.78A	0.17B	2.35B	0.91A	0.66A
Ratio	50:50	129B	1.76A	0.32B	3.16B	0.82B	0.68A
	25:75	160A	1.80A	0.39A	3.37A	0.77B	0.50B
	0:100	161A	1.75A	0.12C	1.42C	0.99A	0.48B
Significance							
Material		*	Ns	***	***	*	***
Ratio		***	Ns	***	***	**	***
M x R		Ns	*	***	***	**	**

Ns, *, **, *** indicate not significant, statistically significant differences at $P \leq 0.05$, $P \leq 0.01$, $P \leq 0.001$, respectively. Values in the same column with different letters differ at $P \leq 0.05$ (Tukey test).