

What is the stability of additional organic carbon stored thanks to alternative cropping systems and organic wastes products application? A multi-methods evaluation

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Table. S1: Mass and C distribution in size and density fractions after 21 years of organic wastes products (OWPs) application. Mean \pm standard deviation of 4 replicates. Soils were sampled in all treatments with application of municipal solid waste (MSW) compost, biowaste compost (BIOW), farmyard manure (FYM), and the control without organic input (CON-QA). The different letters indicate significant differences between treatments at the 5%.

Mass fraction (g.kg ⁻¹ Bulk soil)									
Treatment	Bulk soil	cMOP	fMOP	cSand	fSand	csilt	fSilt	Clay	Recovery (%)
CON-QA		2.73 \pm 1.16 b	6.26 \pm 0.75 b	8.36 \pm 1.66 c	74.21 \pm 11.05	441.3 \pm 16.38	255.79 \pm 7.26	211.34 \pm 24.46	94.32 \pm 1.17
MSW		2.86 \pm 0.19 b	10.13 \pm 2.60 a	29.51 \pm 20.73 b	75.35 \pm 8.96	425.79 \pm 7.59	240.46 \pm 25.51	215.90 \pm 20.90	92.63 \pm 1.43
FYM		2.76 \pm 0.53 b	13.22 \pm 1.33 a	13.18 \pm 1.56 b	79.66 \pm 11.69	434.48 \pm 8.88	211.25 \pm 40.83	245.45 \pm 30.23	93.45 \pm 1.13
BIOW		3.90 \pm 0.89 a	10.77 \pm 1.56 a	22.04 \pm 4.48 a	74.82 \pm 3.69	437.65 \pm 21.41	212.86 \pm 36.01	237.96 \pm 46.04	93.87 \pm 1.74
	ANOVA	P<0.05	P<0.05	P<0.05	P>0.05	P>0.05	P>0.05	P>0.05	P>0.05
Carbon content in fraction (g C. kg ⁻¹ fraction)									
CON-QA		374.21 \pm 30.87	166.38 \pm 31.41 bc	5.14 \pm 0.75 c	0.81 \pm 0.14 a	1.07 \pm 0.14 c	0.83 \pm 0.15	30.55 \pm 1.15 bc	
MSW		384.17 \pm 63.40	177.21 \pm 32.61 b	7.38 \pm 0.59 b	0.54 \pm 0.30 ab	1.35 \pm 0.09 b	1.04 \pm 0.36	36.44 \pm 2.48 ab	
FYM		383.91 \pm 53.51	184.95 \pm 15.36 ab	11.14 \pm 1.14 b	0.60 \pm 0.20 ab	1.41 \pm 0.07 b	1.44 \pm 0.84	35.03 \pm 5.25 ab	
BIOW		391.03 \pm 4.17	219.02 \pm 19.21 a	19.60 \pm 2.65 a	0.84 \pm 0.09 a	1.95 \pm 0.34 a	1.25 \pm 0.32	40.21 \pm 6.59 a	
	ANOVA	P>0.05	P<0.05	P<0.05	P<0.05	P<0.05	P>0.05	P<0.05	
Carbon content in Bulk soil (g C. kg ⁻¹ Bulk soil)									
CON-QA	9.92 \pm 0.63 c	1.03 \pm 0.48 bc	1.02 \pm 0.09 c	0.04 \pm 0.01 c	0.06 \pm 0.02	0.47 \pm 0.06 cd	0.21 \pm 0.04	7.13 \pm 0.60 c	111.18 \pm 9.41
MSW	13.84 \pm 0.16 b	1.10 \pm 0.21 ab	1.73 \pm 0.21 b	0.21 \pm 0.15 b	0.04 \pm 0.02	0.58 \pm 0.04 bc	0.25 \pm 0.11	8.49 \pm 0.35 b	93.92 \pm 3.17
FYM	13.91 \pm 0.37 b	1.08 \pm 0.35 ab	2.43 \pm 0.13 a	0.15 \pm 0.03 b	0.05 \pm 0.02	0.61 \pm 0.04 bc	0.29 \pm 0.16	9.17 \pm 0.94 ab	103.94 \pm 9.33
BIOW	16.04 \pm 0.68 a	1.53 \pm 0.35 a	2.34 \pm 0.21 a	0.44 \pm 0.14 a	0.06 \pm 0.009	0.85 \pm 0.14 a	0.26 \pm 0.05	10.12 \pm 0.78 a	102.16 \pm 5.79
ANOVA	P<0.05	P<0.05	P<0.05	P<0.05	P>0.05	P<0.05	P>0.05	P>0.05	P>0.05
Distribution of total C within the fractions (%)									
CON-QA		10.25 \pm 4.55	10.29 \pm 1.08	0.43 \pm 0.11	0.68 \pm 0.12	4.72 \pm 0.57	2.14 \pm 0.41	71.49 \pm 5.03	
MSW		8.87 \pm 1.66	13.98 \pm 1.73	1.73 \pm 1.21	0.34 \pm 0.38	4.64 \pm 0.36	2.03 \pm 0.88	68.40 \pm 2.39	
FYM		7.84 \pm 2.56	17.65 \pm 1.60	1.06 \pm 0.17	0.65 \pm 0.32	4.45 \pm 0.37	2.09 \pm 0.97	66.25 \pm 2.63	
BIOW		9.75 \pm 2.11	15.00 \pm 1.80	2.79 \pm 0.82	0.69 \pm 0.20	5.44 \pm 0.80	1.66 \pm 0.31	64.66 \pm 2.60	

Table. S2: Mass and C distribution in size and density fractions. Mean \pm standard deviation of 4 replicates. Soils were sampled in conservation agriculture (CA), organic agriculture (ORG) and conventional agriculture (CON-LC). The different letters indicate significant differences between treatments at the 5%.

Mass fraction (g.kg ⁻¹ Bulk soil)									
Treatment	Bulk soil	cMOP	fMOP	cSand	fSand	csilt	fSilt	Clay	Recovery (%)
CON-LC		1.86 \pm 0.60	5.34 \pm 0.84 b	33.22 \pm 4.64	210.39 \pm 16.89	352.64 \pm 19.36	193.97 \pm 40.64	202.99 \pm 18.91	94.83 \pm 2.58
ORG		2.35 \pm 0.21	6.39 \pm 1.17 ab	35.04 \pm 2.60	220.86 \pm 9.53	349.21 \pm 10.36	156.30 \pm 13.03	229.84 \pm 18.62	94.48 \pm 1.24
CA		2.62 \pm 0.59	8.79 \pm 2.19 a	98.68 \pm 68.58	249.02 \pm 69.79	272.11 \pm 90.61	132.68 \pm 38.67	236.11 \pm 25.75	95.63 \pm 2.24
	ANOVA	P>0.05	P<0.05	P>0.05	P>0.05	P>0.05	P>0.05	P>0.05	P>0.05
Carbon content in fraction (g C. kg ⁻¹ fraction)									
CON-LC		295.37 \pm 98.31	123.87 \pm 82.27 b	1.46 \pm 0.17	0.33 \pm 0.14	0.73 \pm 0.20 b	1.09 \pm 0.25b	11.12 \pm 1.49 c	
ORG		324.38 \pm 18.76	173.77 \pm 40.93 a	1.93 \pm 0.68	0.48 \pm 0.09	1.43 \pm 0.23 ab	4.39 \pm 2.21a	26.83 \pm 1.67 b	
CA		309.20 \pm 37.10	160.01 \pm 28.51 ab	2.14 \pm 2.16	0.40 \pm 0.12	2.31 \pm 0.91 a	5.09 \pm 4.35a	35.66 \pm 4.05 a	
	ANOVA	P>0.05	P<0.05	P>0.05	P>0.05	P<0.05	P<0.05	P<0.05	
Carbon content in Bulk soil (g C. kg ⁻¹ Bulk soil)									
CON-LC	9.82 \pm 0.48 b	0.72 \pm 0.30	1.00 \pm 0.09 b	0.08 \pm 0.05	0.10 \pm 0.03	0.47 \pm 0.07	0.55 \pm 0.38	6.42 \pm 0.71 b	102.05 \pm 4.61
ORG	10.39 \pm 0.42 b	0.76 \pm 0.05	1.08 \pm 0.08 b	0.07 \pm 0.03	0.10 \pm 0.02	0.50 \pm 0.07	0.67 \pm 0.29	6.74 \pm 0.51 b	101.15 \pm 6.47
CA	13.30 \pm 1.05 a	0.82 \pm 0.28	1.36 \pm 0.16 a	0.11 \pm 0.03	0.10 \pm 0.04	0.57 \pm 0.05	0.63 \pm 0.03	9.02 \pm 1.05 a	99.31 \pm 6.40
ANOVA	P<0.05	P>0.05	P<0.05	P>0.05	P>0.05	P>0.05	P>0.05	P<0.05	P>0.05
Distribution of total C within the fractions (%)									
CON-LC		7.11 \pm 2.87	10.03 \pm 1.10	0.80 \pm 0.52	0.94 \pm 0.21	4.64 \pm 0.27	6.31 \pm 0.48	64.01 \pm 3.26	
ORG		7.25 \pm 0.43	10.25 \pm 0.44	0.64 \pm 0.25	1.00 \pm 0.18	4.73 \pm 0.60	6.31 \pm 2.38	64.23 \pm 3.12	
CA		6.19 \pm 1.80	10.35 \pm 1.33	0.87 \pm 0.19	0.74 \pm 0.27	4.32 \pm 0.31	4.15 \pm 2.73	68.40 \pm 0.95	