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Supplementary material for

Importance of sugarcane straw maintenance to prevent soil organic matter depletion in a Nitisol in the central-southern region of Brazil

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Material and methods

Equations to calculate the carbon management index (CMI) as described in Blair *et al*. (1995):

$$CMI(\%) = CPI \times LI \times 100$$

Where, CPI is the carbon pool index (equation S1) and LI is the lability index (equation S2)

$$CPI = \left(\frac{C_{treat}}{C_{ref}} \right) \quad \text{(S1)}$$

Where, C_{treat} is the soil C stocks under treatments (MR, HR and TR) and C_{ref} is the soil C stocks under reference area (NR)

$$LI = \left(\frac{L_{treat}}{L_{ref}} \right) \quad \text{(S2)}$$

Where, L_{treat} is the C lability (equation S3) under treatments (MR, HR and TR) and L_{ref} is the C lability under reference area (NV)

$$L = \left(\frac{C_L}{C - C_L} \right) \quad \text{(S3)}$$

Where, C_L is the labile-C fraction (g m^{-2}) and C is the soil C stocks (g m^{-2})

Results

Table S1. Statistical analyses responses for variables studied in an Eutric Nitisol in Igaraçú do Tietê, São Paulo state – Brazil

Analyses responses	†C	N	C_L	MBC	MBN	C:N	MBC:MBN	MBC:C	MBN:N	C_L:C	MBC:C_L	CMI
First year§												
F-value blocks	1.451 ns	1.046 ns	1.579 ns	1.701 ns	2.530 ns	1.504 ns	1.534 ns	0.137 ns	2.554 ns	0.326 ns	3.678 ns	0.4330 ns
F-value treatments	0.958 ns	0.901 ns	3.712 ns	2.314 ns	2.554 ns	1.262 ns	2.087 ns	1.918 ns	1.615 ns	2.051 ns	1.125 ns	27.531**
SMD	3.51	0.55	9.26	10.25	1.07	2.55	4.91	0.52	0.57	0.65	6.09	5.09
C.V.(%)	5.93	10.82	4.74	9.35	15.41	9.79	13.62	12.70	19.05	8.91	4.90	2.48
Second year												
F-value blocks	1.437 ns	0.984 ns	1.803 ns	1.683 ns	2.315 ns	1.527 ns	1.643 ns	0.135 ns	2.057 ns	0.323 ns	3.795 ns	0.935 ns
F-value treatments	15.938 *	0.131 ns	20.134 **	49.957 **	12.147 **	1.172 ns	15.912**	3.679 ns	8.082*	3.974*	3.565 ns	34.651**
SMD	1.01	0.17	11.28	17.05	2.03	2.73	2.62	0.98	0.26	0.52	7.52	4.36
C.V.(%)	5.88	11.44	9.85	15.01	13.49	8.99	13.81	12.51	9.70	8.82	4.87	2.32

† Variables: C = C stock; N = N stock; C_L = labile-C; MBC = microbial biomass carbon; MBN = microbial biomass nitrogen; CMI = carbon management index. §First year: October 2015 to November 2016, Second year: November 2016 to October 2017. SMD = significant minimum difference; C.V. = coefficient of variation. ** significance level at 1%; * significance level at 5%; ns = no significant.

Table S2. Soil temperature and moisture to different rates of straw removal in an Eutric Nitisol in Igaraçú do Tietê, São Paulo state – Brazil. NR: no removal; MR: medium removal; HR: high removal; TR: Total removal.

Sampled days	First year[§]					Second year				
	30 d	60 d	120 d	180 d	360 d	30 d	60 d	120 d	180 d	360 d
	Soil temperature (^oC)[†]									
NR	25.4	25.6	23.4	19.2	22.0	24.6	26.6	26.6	19.3	22.7
MR	26.3	26.2	23.6	19.3	22.7	25.1	27.3	26.4	19.8	22.6
HR	26.9	27.9	24.7	19.8	23.1	25.9	28.0	22.7	19.8	22.9
TR	27.1	28.7	24.8	19.6	23.2	26.1	28.2	22.7	20.1	22.8
	Soil moisture (g g^{-1} soil)[‡]									
NR	0.15	0.16	0.13	0.12	0.16	0.14	0.17	0.14	0.11	0.15
MR	0.12	0.14	0.13	0.12	0.16	0.13	0.15	0.15	0.11	0.15
HR	0.11	0.13	0.13	0.12	0.15	0.11	0.13	0.12	0.11	0.14
TR	0.11	0.12	0.13	0.12	0.15	0.10	0.13	0.10	0.09	0.14

[§] First year: October 2015 to November 2016, Second year: November 2016 to October 2017. [†] Soil temperature (^oC) was recorded at three points using an automated system that performs one measurement per hour and is equipped with copper–constantan thermopile sensors installed at the 5 cm soil depths. [‡] Soil moisture (g g^{-1} soil) was determined on disturbed samples collected from three points at the 5 cm soil depths. Soil water content was determined by oven-drying (105°C) the samples until constant mass was reached.