

Biotic and abiotic oxidation of compost formulated with charcoal and enriched with silicate powdered rocks

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Introduction

Charcoal has a chemical structure highly aromatic and can be oxidized by biotic and abiotic processes, forming functional groups with net negative charges on the surface of its particles.

The aim of the present work is to evaluate the biotic and abiotic oxidation of compost formulated with charcoal to which was added silicon powdered rocks, rich in oxidizing agents such as nickel.

Results and Discussions

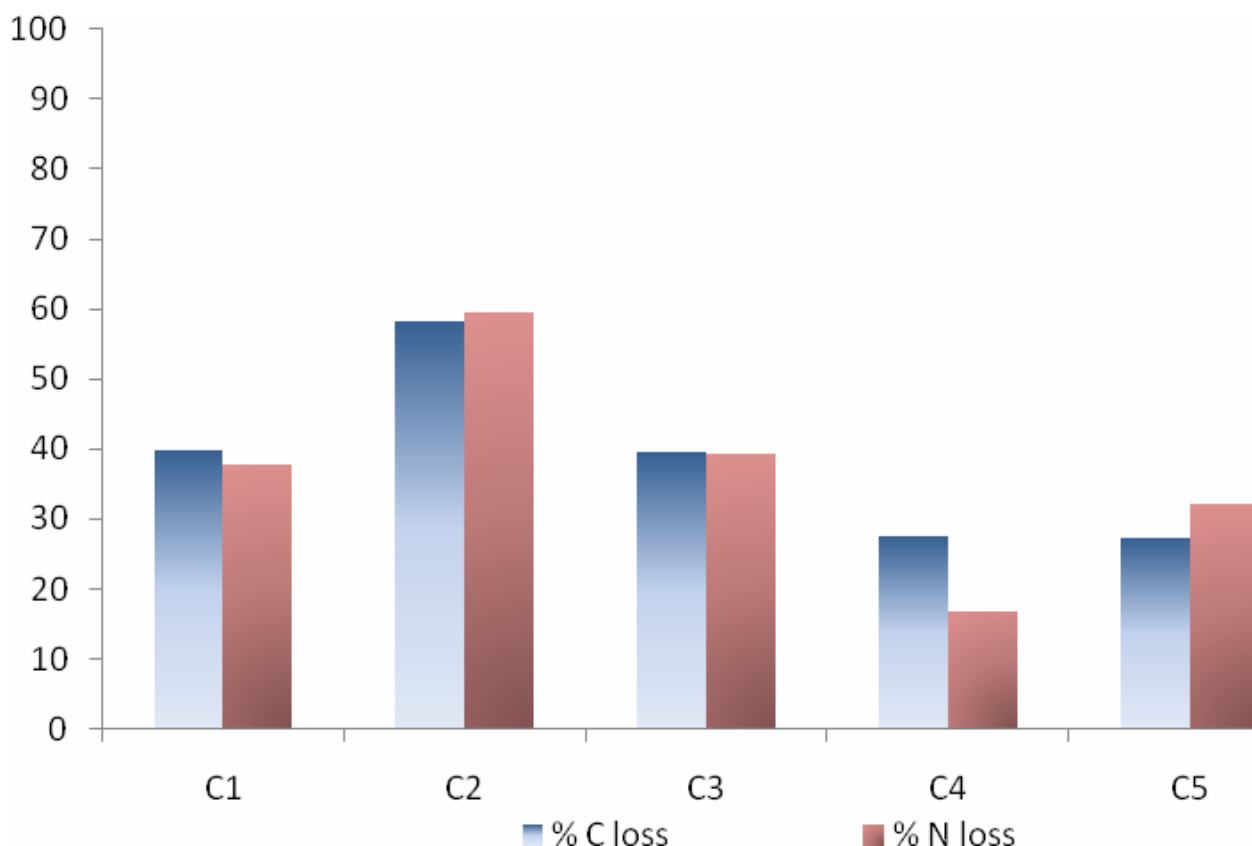


Figure 1. Losses of C and N of composted charcoal, filter cake and castor oil plant (C1), and powdered silicate rocks added at 0 (C2), 30 (C3), 60 (C4) and 90 (C5) days after the start of the composting process.

Table 1. Elemental composition, atomic ratio and oxidation rate (ω) compost obtained from different materials and mineral enrichments.

Compost	C	N	H	O	Atomic ratio			ω
	dag kg ⁻¹				C:N	H:C	O:C	
C1	48,24	2,12	3,33	46,31	19,54	0,01	1,28	1,85
C2	36,26	1,73	2,46	59,54	17,91	0,01	2,19	3,22
C3	47,39	2,02	3,95	46,64	20,12	0,01	1,31	1,88
C4	48,00	2,34	3,27	46,39	17,56	0,01	1,29	1,86
C5	49,23	1,95	3,04	45,78	21,63	0,01	1,24	1,80
Average	45,82	2,03	3,21	48,93	19,35	0,01	1,46	2,12
Error	±5,39	±0,22	±0,54	±5,94	±1,67	±0,00	±0,41	±0,61

Conclusions

a) Enrichment of compost with powder of silicate rocks at the beginning of composting process (C2) has enabled most significant losses of C and N, the order of 58 and 59% respectively. In this same treatment, there was greater development of quantitative negative charges on the materials composted, inferred to rate of oxidation, in the order of 74% higher than the control (C1).

b) The lowest losses of C and N were of the treatment C4, with 27 and 16%, respectively.

c) The addition of powders of silicate rocks 30 days after the beginning of composting process did not favor the oxidation of materials composted, since the differences in their rates of oxidation compared to control (C1) did not exceed 3%.

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