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Effect of different level of charcoal powder in the vegetative growing of feijão Caupi

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Introduction

The biochar, principal component of the organic matter in the Amazon Dark earth is formed by organic compost with high resistence to the decomposition [1], In addition it has a functional group able to retain water and adsorb organic substances, decreasing nutrient loose by leaching contributing to the increase of CEC and soil structure by interaction with soil mineral matrix [2,3]. Aiming to evaluate the effect of different level of charcoal powder (0, 100, 200 e 300 T ha^{-1}) plus 3,0 T ha^{-1} and 0 T ha^{-1} of pure chicken manure, was carried out a trial following a completely randomized design in the factorial (4x2), totalizing eight treatment and five replication. The soil was Distrofic Yellow Oxisol and before the treatment application the soil received 2 t ha^{-1} of dolomitic lime. The species was Cow pea (*Vigna unguiculata L.*).

Results and Discussions

The table 1 is showing that treatment 8 (300 T ha^{-1} of charcoal powder in the presence of chicken manure was who showed the higher dry matter stem production (6,18g), with six time high then control plot. The slower value of $pH_{(H2O)}$ was observed in the control plot (5,5) and the higher value was determined in the treatment 7 that received 200 T ha^{-1} of charcoal powder plus 3 T ha^{-1} of pure chicken manure, with $pH_{(H20)}$ value of 6,2. The exchangeable aluminium in all treatment presented level considered low, with exception for treatment 8 that stayed on superior limit of the line considered average. The exchangeable bases potassium, calcium and magnesium showed values below the average.

Table 1. Average values of the soil chimistry atributes determined after the experiment harvested.

Treat.	Level (t ha^{-1})		pH		Ca^{++}		Mg^{++}	K^{+}	Al^{+++}		Fe	Zn	Mn
	Charcoal	Chicken manure	H_2O		cmolc kg^{-1}						mg kg^{-1}		
T1	0	0	5,5	b	0,54	c	0,35	0,11	0,18	b	392,6	4,64	3,8
T2	100	0	6	ab	0,96	ab	0,53	0,33	0,17	b	384,4	5,66	6,84
T3	200	0	6,1	ab	0,99	ab	0,42	0,37	0,09	b	350,2	5,3	5,82
T4	300	0	5,9	ab	0,74	c	0,57	0,39	0,33	ab	384,8	5,02	5,66
T5	0	3	5,8	b	0,9	c	0,4	0,2	0,24	b	360,4	4,84	4,88
T6	100	3	5,8	ab	0,9	c	0,45	0,36	0,23	b	381	5,06	6,06
T7	200	3	6,2	a	1,24	bc	0,6	0,35	0,27	ab	390,8	5,6	6,82
T8	300	3	5,7	ab	0,78	c	0,46	0,29	0,99	ab	382,4	3,88	4,66

*Average following by the same letter in the colum no differ by Tukey test (5%) of probability.

The results showed that treatment 8 (300 T há$^{-1}$ of the charcoal powder with chicken manure) was who presented the higher stem dry matter production (6,18g), equivalent six time the control plot. Considering the cost and benefit rate in term of improve the plant growing and soil chemistry properties the treatment three can be considered the treatment in who showed the best response to addition charcoal powder.

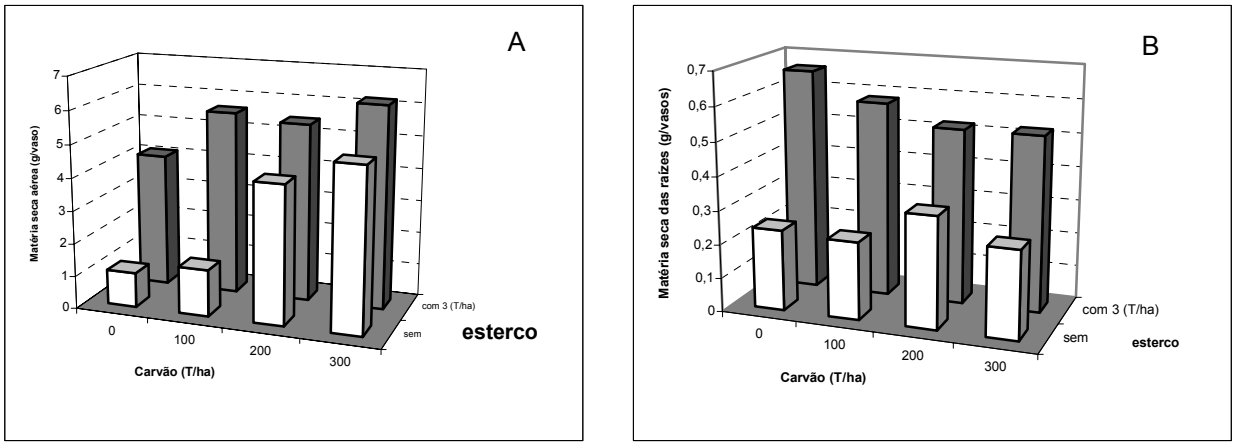

Figure 1. Stem dry matter production (A), and root dry matter (B) of cow pea as a function of different level of charcoal powder (0; 100; 200 e 300 T/ha) with and no chicken manure applied (0 e 3 T ha^{-1}).

Conclusions

The treatment eight (300 t ha^{-1} of charcoal powder and 3 t $há^{-1}$ of chicken manure) allowed the higher stem dry matter production;

The root dry matter production was lower in the treatment that received the higher level of charcoal powder.

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