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Assessing soil quality and soil carbon sequestration on biochar application for increasing organic vegetable in acid soils

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Introduction

- Each year it has left over materials from agriculture and industrial agriculture.
- If there is no good management to them, they can affect to environment.
- The waste materials from agriculture such as corn stubbles, rice husks or coconut peels can be very useful to agricultural land.

Introduction

- Therefore, introducing biochar to be used in agriculture will probably reduce costs in using chemical fertilizers and also can increase carbon sequestration in soil. In addition to this, it is a good way to conserve natural resources and environment.

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Objectives

- To study the effects biochar on soil properties physically, chemically and biologically in the area of acid soils.
- To study the amount of carbon in soil from using biochar as soil amendments.
- To study the perception of farmers with biochar for soil quality.

Biochar Tank

Biochar from rice husk

Expected output

- To promote farmers, agriculturalists and people who are interested in agriculture to gain knowledge of using biochar as soil amendments.

- To disseminate and build understandings among farmers in making use of biochar for agriculture.

Materials and Methods

Methods

- The experimental design: is Randomized Complete Block Design (RCBD) which consists of 5 treatments as following;

1. Control (Conventional Practices, no biochar)
2. Biochar from rice husk 3 tons per hectare
3. Biochar from rice husk 6 tons per hectare
4. Biochar from rice husk 12 tons per hectare
5. Biochar from rice husk 18 tons per hectare

- **Selecting experiment area:**

Amphoe Bung Sam Pan, Phetchabun Province.

Data collection and analysis

- Chemical, physical and biological properties in soil.
- Yield of corn.
- The perception of farmers with biochar for soil quality.

the perception of farmers with biochar

- After applying biochar for soil amendment, thirty of farmers were selected and were interviewed for perception to biochar application to agricultural field.

Meeting with all staffs

Study site (TOA - Bung Sam Pan, Petchaboon province)

Collecting soil samples for analysis

Meeting and explaining the biochar project to farmers

Meeting with farmers

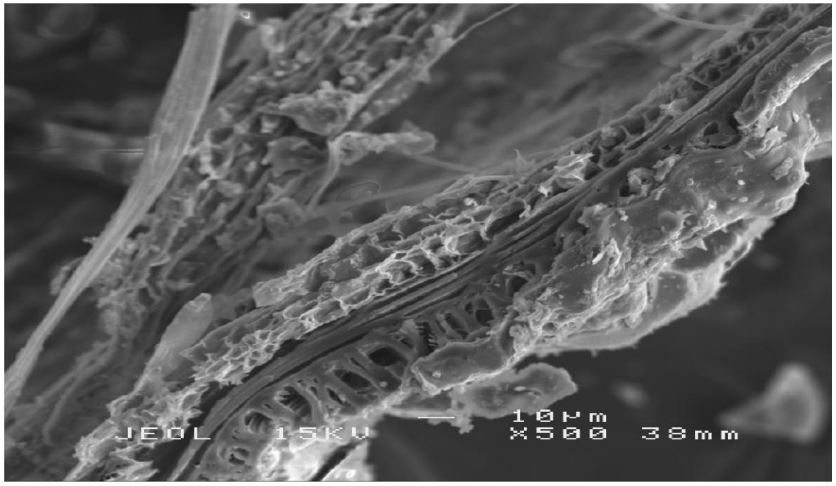
Ban Bo Deau community, Phetchabun province

Small rice mill of community in the Ban bo deau village

Biochar kiln

Rice husk

biochar



Structural of biochar

Interview farmers about biochar (before experiment)

60 DAYS OF BABY CORN

Data Collection

- Yield
- Soil Analysis

Demonstration plot

Ban Bo Deau community

Results

Yield

- Biochar application at different rates in soil amendment of acid soil tended to increase the productivity of baby corn whereby with biochar application for 12 tons per hectare, baby corn yielded the most, accounting for 5,457.9 kilograms per hectare.

Carbon percentage

- It was found that biochar application at different rates tended to increase the amount of carbon percentage in the soil whereby it varied according to the amount of biochar application.

Chemical properties

- Available phosphorus, extractable potassium and calcium increased distinctly.

Biological properties

- It was found that the amount of actinomycetes, bacteria and fungi had a tendency to increase.

Table 1: Changes of physical properties of the soil

Treatment	Aggregate size distribution (%)					MWD (mm)
	> 2 mm	1-2 Mm	0.5-1 mm	0.25-0.5 mm	0.105-0.25 mm	
Control	49.46	19.36	12.47	7.99 b	6.66	3.06 b
biochar 3 t ha^{-1}	49.36	19.37	12.09	7.96 b	6.69	3.53 b
biochar 6 t ha^{-1}	49.67	19.28	12.19	8.13 b	6.71	4.02 a
biochar 12 t ha^{-1}	50.26	19.48	12.48	8.26 ab	6.79	4.05 a
biochar 18 t ha^{-1}	50.19	19.97	12.91	8.58 a	6.80	4.11 a
p<0.05	ns	ns	ns	*	ns	*
CV (%)	2.21	2.63	2.60	2.65	2.52	12.82

After the end of the experiments, it was found that aggregate size distribution (%) is increased after the rate of biochar increased.

Data of farmer' perception

- Mostly farmers had positive attitude to biochar and they thought that biochar is good for soil improvement and they are interested in using biochar in their own agricultural areas.

- In the opinion of agricultural officers was that biochar is useful for agriculture, therefore, biochar is an alternative for soil enhancement, which can increase agricultural productivity.

FUTURE WORK

1. Extend biochar research work to farmers on different locations/problem soils.
2. Develop biochar kiln technology for biochar production.
3. Gain knowledge to farmer's perception on the effectiveness of biochar for soil improvement.
4. Promote the sustainable production and use of biochar through research, policy, technology.
5. Establish "Center of Excellence" on biochar for research and implementation.


THANK YOU
FOR YOUR ATTENTION