

# High Solids Anaerobic Digestion Amend with **Biochar** for **Enhanced Energy Recovery** from Banana Waste

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# Why ?



1 ton

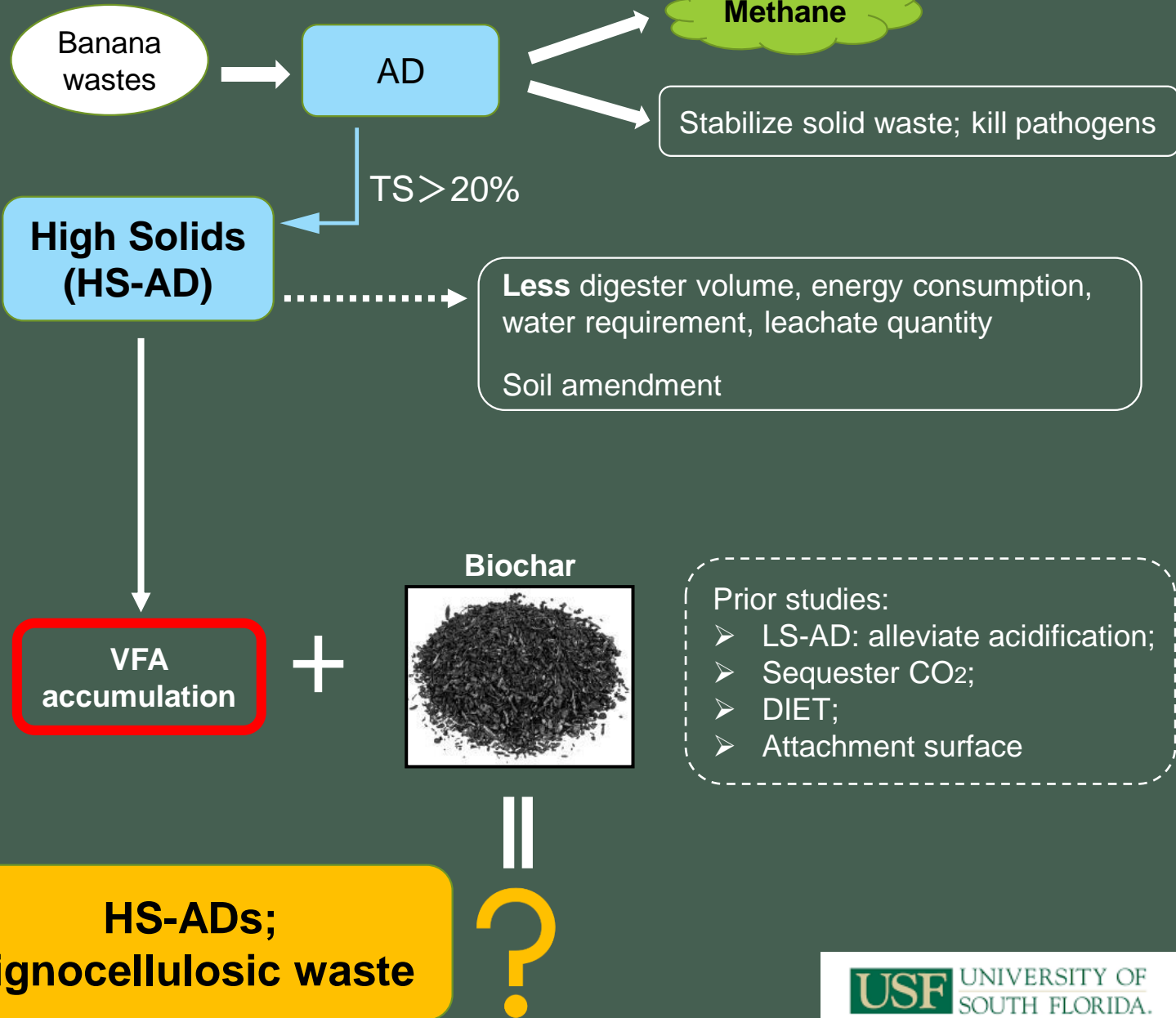


4 ton

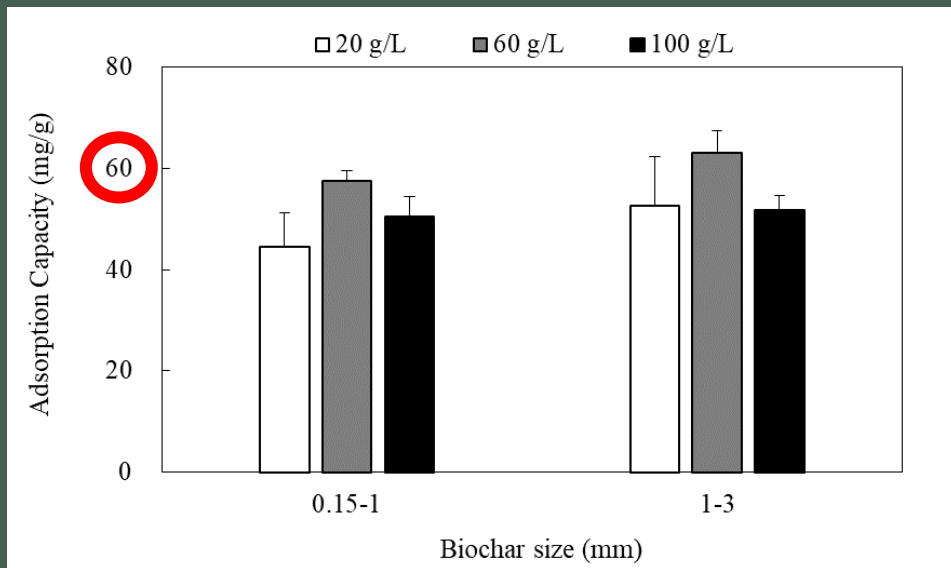


High content of organic matter  
(lignin, cellulose)

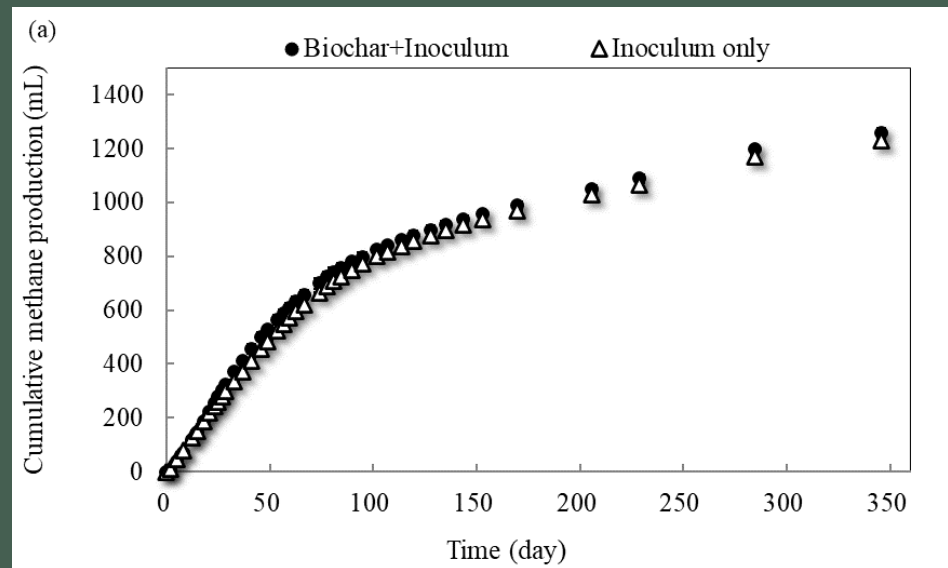
# How ?



### Biochar adsorption study

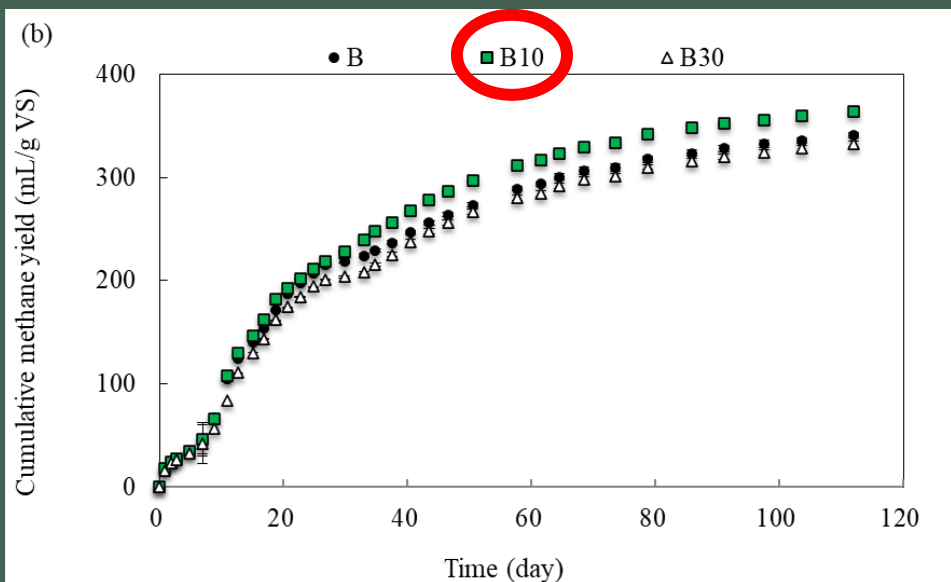


### Biochar control



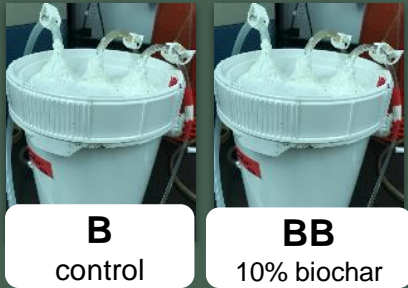
### BMP assay:

substrate: peel: stem: leave=1:1:1 (by TS); S/l=1; TS: 20%



### Summary:

- ✓ VFA adsorption capacity 60 mg/g;
- ✓ Biochar not bioavailable;
- ✓ 10% biochar enhanced methane by 7%



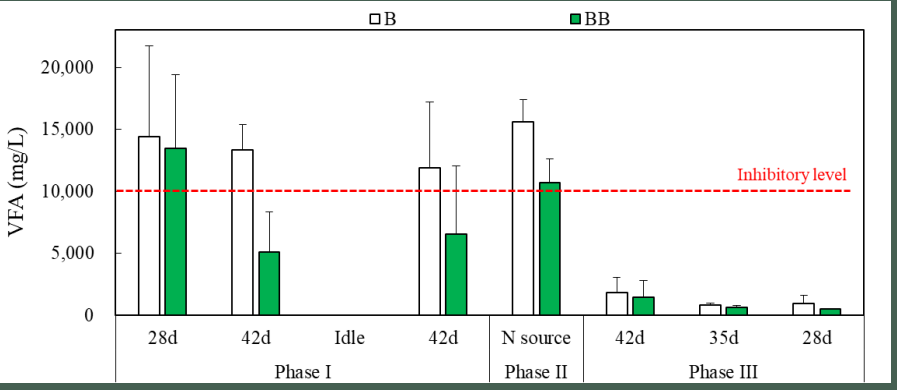
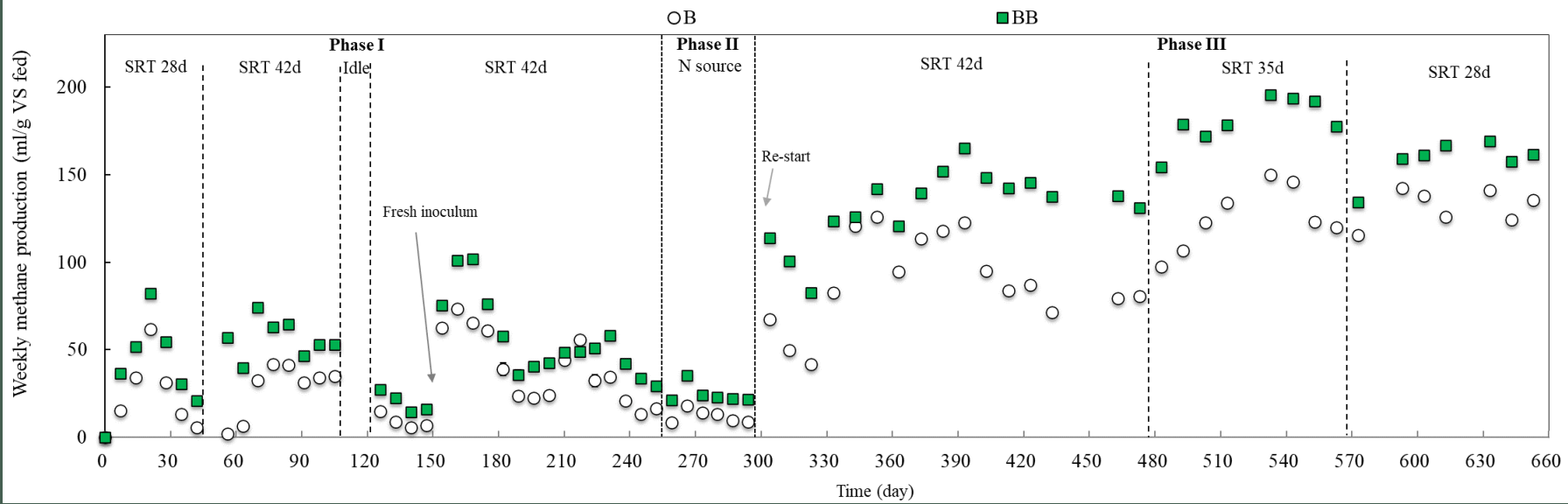
Phase I SRTs (28, 42d); Idle

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Phase II N source

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Phase III N source + micro-nutrient; SRTs (42, 35, 28d)

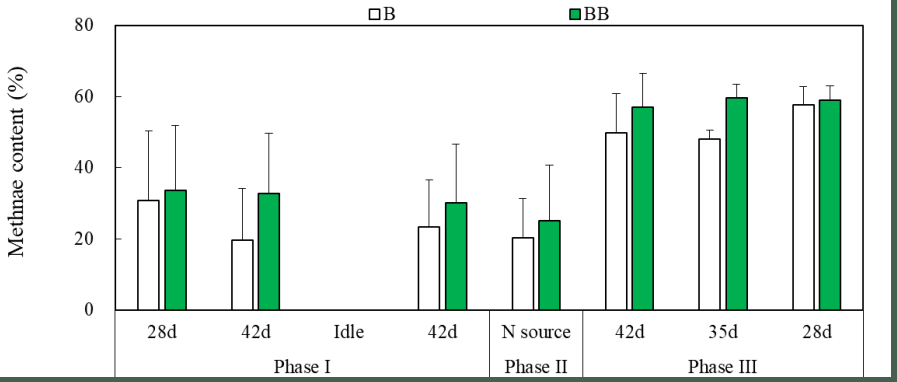


### Specific methanogenic activity (SMA)

	B	BB
H <sub>2</sub> + CO <sub>2</sub> consuming	High	Low
Acetate consuming	Low	High

### Summary:

- ✓ Biochar increased system recovery, stability and methane production;
- ✓ VFA adsorption;
- ✓ DIET;
- ✓ Attachment surface
- ✓ CO<sub>2</sub> sequester



TN, TP, TK

