Charcoal production and utilization in Thailand

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Potential for Charcoal production

Total Area	**51,311,502 ha**
Agricultural Land	**27,020,521 ha (52.7 %)**
Eucalypt Planting Area	**720,000 ha**

(Land Development Department, 2011)

Raw Material for Charcoal production

- Fuel Wood
  (Eucalypt, Acacia, Leucaena, Mangrove, Longan, Tamarind)
- Rice Husk
- Corn Cob
- Coconut shell

Charcoal production in Thailand

Types of Charcoal Kiln

- Ground Pit or Heap Kiln
- Mud Kiln
- Oil Drum Kiln
- Brick Kiln
- Iwate or Thai-Iwate Kiln

Ground Pit , Heap Kiln

% yield	= 15-18%
production period	= 1-2 days
lifetime	= >3 years
Wood vinegar	= yes

Mud Kiln

% yield	= 20-25%
production period	= 5-7 days
lifetime	= >3 years
Wood vinegar	= yes

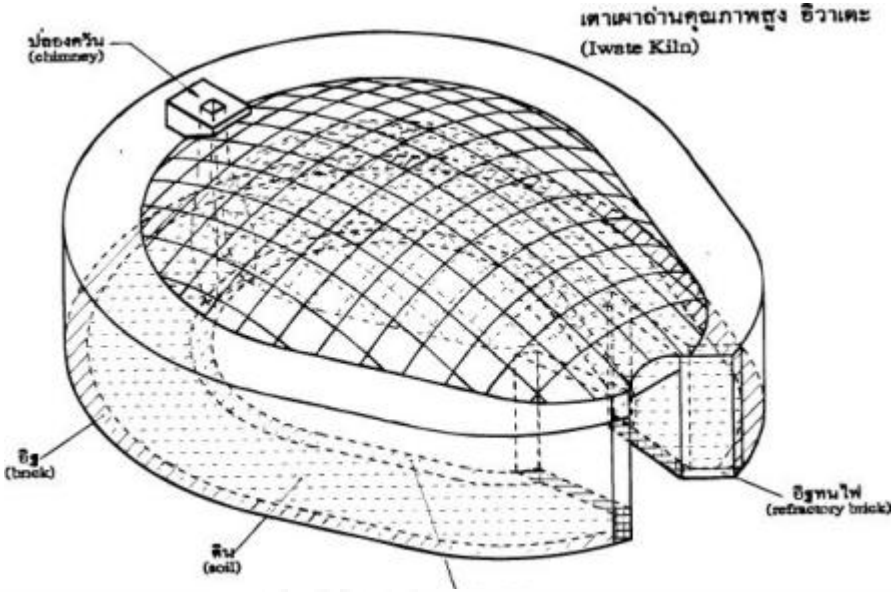
Oil Drum Kiln

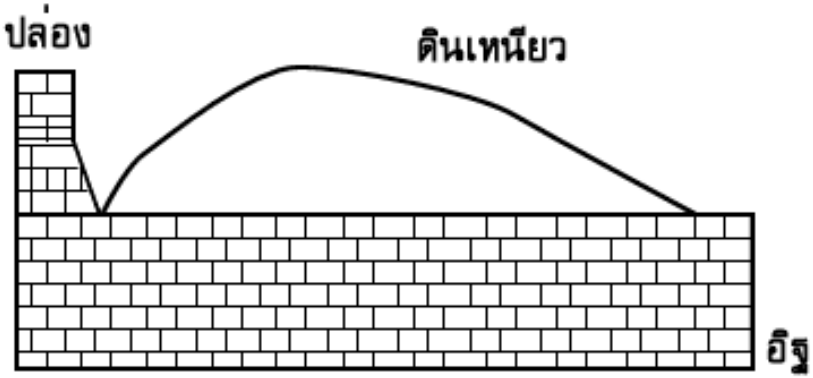
% yield	= 15-20%
production period	= 1 days
lifetime	= 2-3 years
Wood vinegar	= yes

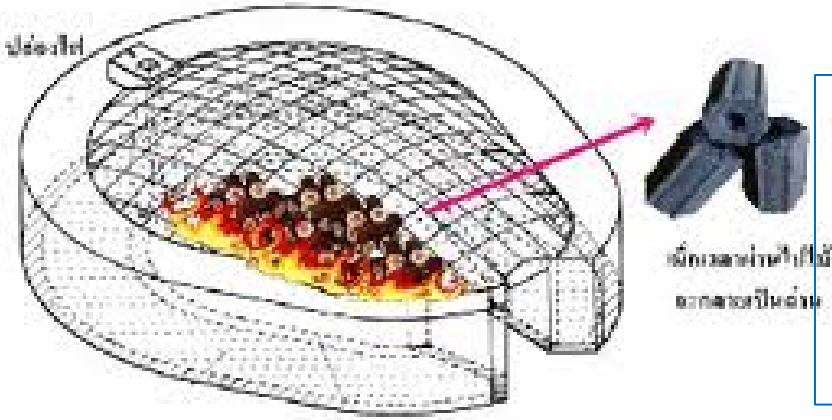
Brick Kiln

% yield	= 20-25%
production period	= 7 days
lifetime	= >3 years
Wood vinegar	= yes

Iwate or Thai-Iwate Kiln







% yield	= 10-20%
production period	= 7 days
lifetime	= >5 years
Wood vinegar	= yes

Iwate or Thai-Iwate Kiln

Utilization of Charcoal

- Fuel
- Household Products
- Agricultural uses

Iwate or Thai-Iwate Kiln

Compounds	
Organic acids	formic acid; acetic acid; propinoic acid; butyric acid; isobutyric acid; valeric acid; isovaleric acid; crotonic acid; isocapronic acid; tiglic acid; enanthic acid; levulinic acid, etc.
Carbonyl compounds	formaldehyde; acetaldehyde; propionaldehyde; isobutylaldehyde; butylaldehyde; valeraldehyde; isovaleraldehyde; glyoxal; acrolein; crotonaldehyde; furan; pyran; furfural; 5-hydroxymethylfurfural; acetone
Alcohols	methanol; ethanol; propanol; isopropanol; allylalcohol; isobutylalcohol; isoamyl alcohol, etc.
Phenolic compounds	phenol; o-cresol; m-cresol; p-cresol; 2,4-xylenol; 3,5-xylenol; 4-propylphenol; trimethylphenols; pyrocatechol; 4-methylcatechol; guaiacol; 4-methylguaiaco; 4-ethylguaiacol; 4-propylguaiacol; syringol; 4-methylsyringol; 4-ethylsyringol; 4-propylsyringol; 4-acetosyringol; 4-(2-propio)-syringol; 4-(1-propio)-syringol; cis& trans-4-(1-propenyl)-syringol; 4-(2-propenyl)-syringol; syringaldehyde; vanillin. etc.

Utilization of Wood Vinegar

- ❖ Household products
- ❖ Products for health and beauty
- ❖ Agricultural uses
  - accelerates plant growth
  - acts as pest repellent
  - promotes healthy and balanced plant growth
  - improves sweetness of fruits
  - increases shelf life of fruits and vegetables
  - controls growth of harmful fungi and bacteria

Biochar Experiment

Normally use:
Biochar and organic fertilizer in rate 50:50, mix well then apply into farms

Biochar Experiment

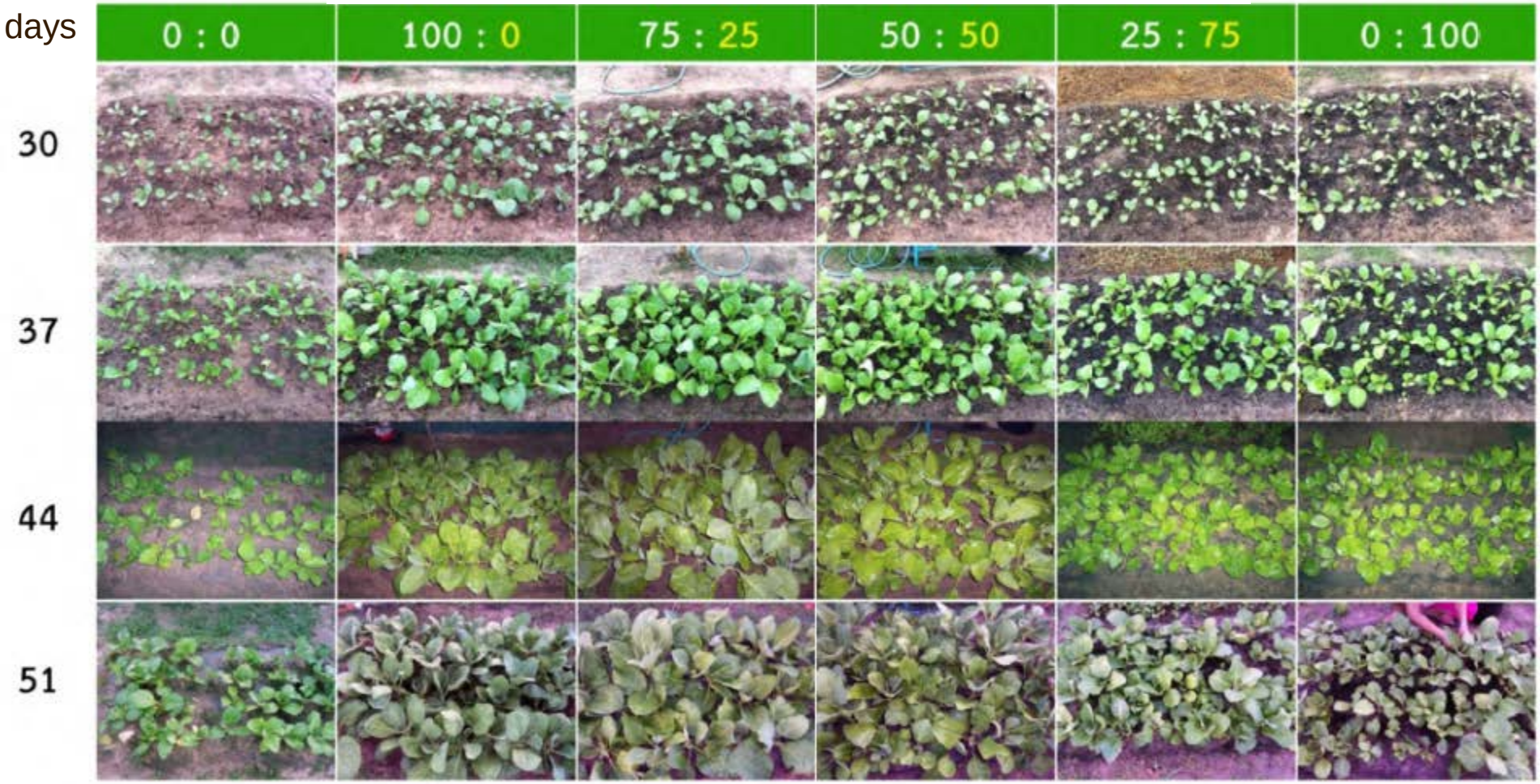
% organic fertilizer : biochar

0:0 100:0 75:25 50:50 25:75 0:100

Publication under Master Thesis of Ms.Siriluck Sirising (2010)

Biochar Experiment

% organic fertilizer : biochar



0 : 0	100 : 0	75 : 25	50 : 50	25 : 75	0 : 100
0.92	4.39	4.85	4.57	2.39	1.98

Total fresh weight within 51 days (kg)

Conclusion

- Charcoal production is very famous in rural area of Thailand, it provides more income for farmer, however an efficiency of the production method need to be enhanced.
- Value added by development of charcoal and wood vinegar products need to be extend.
- There is potential to use and promote biochar for agricultural land in Thailand.
- More studies and information including demonstration plots are needed to explain the benefit of biochar in Thailand and can be extended to the neighboring countries.

THANK YOU