3rd International Biochar Conference
IBI 2010
Progressing from Terra Preta de Índios to the Whole World

Economic research into biocharisation of urban solid waste in China

Chai, CY[a]*; Ding, DWY[b]; Wang, WT[C]

Hebei Tourism Vocational College, Chengde City, Hebei Province, P.R. China
*E-mail: chaiyu-wayne@163.com

Key words: *Trash*, *Biochar technology, Feasibility*

Introduction

With the development of economy, China is producing a huge amount of trash everyday; most of them are urban solid wastes (USW). Today the USW treatments are mainly landfill, incineration, composting, etc. Some of them have fatal weaknesses and are meeting more and more dramatic oppositions from the publics.

This research applies biochar technology to USW treatment in order to avoid the weaknesses and contribute to the mitigation of global climate change.

This research includes 4 aspects:

1. Present situation of USW treatment in China;
2. Laboratory test of USW biocharisation;
3. Assessment of hazardous materials from biocharisation process and its countermeasures; and
4. Contrastive mass production test of USW biocharisation and activated carbonization and the feasibility of USW biocharisation.

Results and Discussions

Biochar can be made from USW, the elemental composition of USW biochar is shown in table 1.

Table 1. The elemental composition of USW biochar

Items	Value
Biochar yield (%)	49.8
Total N (%)	3.030
Total P (%)	3.299
Total K (%)	0.831
pH (water/carbon = 2.5/1)	9.86
Electric conductivity (water/carbon = 20/1, mS/cm)	5.0

Hazardous materials detected in the pyrolysis process are far below the national standards;

The cost of producing biochar using a special-typed pyrolysis system is between $50~60 (excluding the cost of feedstock), it is economical feasible. See table 2.

Table 2. Daily costs and returns of USW biochar production using the special-typed facility

Items	Q'ty	Unit	Price or Costs (US$)	Value or Costs (US$)
Returns				**1,173.00**
Biochar[1] (yield:20%)	4	ton	293.25	1173.00
Bio-oil[2]	0	gallon		0.00
Subsidy from governments[3]	20	ton	8.82	176.40
Costs				52.44
Facility depreciation[4]				5.44
Overhead[5]				10.85
Labor(3 shifts, 1 worker/shift)	3	day	10.29	30.87
Electricity consumption	24	hr	0.22	5.28
Daily profit				**1,120.57**
Annual profit				**403,403.40**

Notes: The explanations of items with superscripts will be provided in the text.

The feasibility of USW biochar is just because of the low cost of the special-typed pyrolysis facility which is easy to be questioned by many people (in case of doubt, please contact me).

Conclusions

The test results revealed the great feasibility of USW biocharisation in China technologically and economically even though there are not subsidies from governments.