The use of compost extracted from municipal solid waste recycling facility as *Hibiscus esculentus* growing medium

Nur Nadiah Zainal Abidin, Jambari Hj. Ali and Nur Azlin Mohd Isa

Department of Biology, Faculty of Science, Universiti Putra Malaysia
Corresponding author: nurnadiahzainalabidin@yahoo.com

Introduction

Rapid increase in urban population, inadequate infrastructure, and shortages of land for landfills are making the management of municipal solid waste one of Malaysia's most critical environmental issues. As reported by Malaysian Country Report (2001), the per capita generation of solid waste in Malaysia varies from 0.45 to 1.44 kg/day depending on the economic status of an area. In general, the per capita generation rate is about 1 kg/day. Malaysian solid wastes contain very high organic waste and consequently high moisture content and the bulk density was above 200 kg/m^3. This high organic waste generated from the municipal solid waste recycling facility in Semenyih can be reused as nutrient source and also growing medium for plant after being composted. The high values of nutrient may increase the plant performance. By reusing municipal solid waste compost, the organic materials being dumped to landfill can be reduced and this will help to save the environment from pollution. Furthermore, reusing the MSW compost also may reduce the emission of greenhouse gasses. In this study, municipal solid waste composition was determined while the performance of plants was observed to determine any benefit of using reused municipal solid waste (MSW) compost as growing medium.

Materials and Methods

The compost sample was collected from Municipal Solid Waste Resource Recovery Center at Semenyih, Selangor while the control soil (Serdang soil) was available from Universiti Putra Malaysia farm. Before starting sowing *Hibiscus esculentus* (lady's finger), the MSW compost composition studies had been conducted. Ten kilograms of MSW compost samples were selected randomly and sorting out materials was done manually. Then, pH levels of normal soil and MSW compost were tested by using pH meter to determine the suitability of soil (acidic or alkaline) as growing medium. Finally, three seeds were sown on a kilogram of 100% normal soil and 100% MSW compost for each twenty polybags. Plant performance such as height of plant, fresh weight and dry weight was recorded at three days interval until 60 days.

Results and Discussion

The composition of municipal solid waste (MSW) compost contained high organic materials (68.8%) and followed by glasses, gravel, plastics, metal and textiles (Table 1).

Table 1: The composition of compost extracted from municipal solid waste recycling facility.

Content	Percentage (by weight, %)	SD (±)
Organic material	68.8	1.78
Glasses	17.3	2.45
Gravel	6.9	1.17
Plastics	4.2	1.08
Metals	1.6	1.93
Textiles	1.1	0.36

The pH values of MSW compost tested was 6.78. At harvest, the trend of *H.esculentus* grown on MSW compost showed slightly better performance compare to normal soil. As no other nutrient supplement was added during experiment, the nutrient from MSW compost show slightly better performance in plant height (Figure 1) but the difference was not significant. However, the fresh and dry weight of *Hibiscus esculentus* was significantly different between MSW compost and

normal soil (Figure 2). The *H.esculentus* grown on MSW compost showed high water content than normal soil.

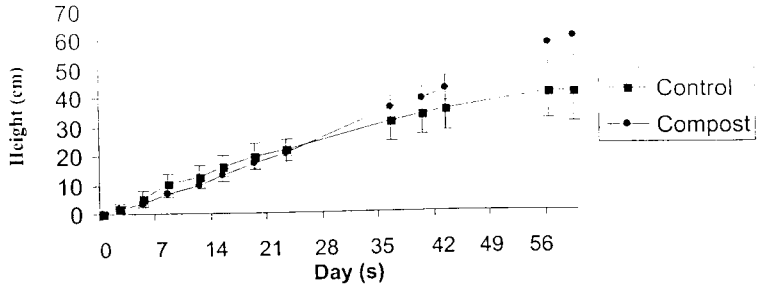

Figure 1: Mean height of *H.esculentus* grown on MSW compost.

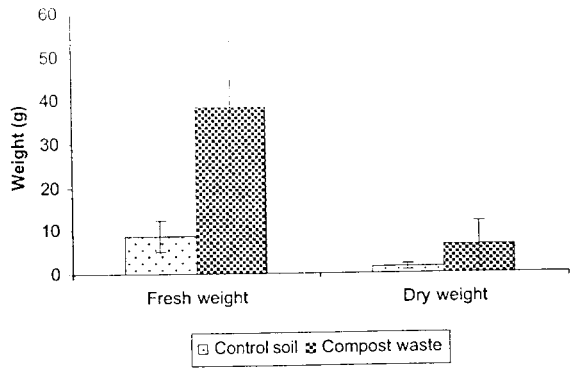

Figure 2: Comparison between fresh weight and dry weight of *H.esculentus* grown on MSW compost and control soil after 60 days.

As conclusion, MSW compost has a potential use as growing medium for *H.esculentus*. For further study, the variability of organic content in the composition of MSW compost needs extra attention as it will effect the plant growth. The plants and fruits also need chemical analysis such as nutrient and heavy metal analysis to make sure the produce is safe for consumption.

References

Ian Hargraves (2002) High Quality In-Vessel Composting: *The sustainable solution to the management of biodegradable solid waste and sewage sludge*, Sustainable Environmental Systems Ltd., England.

Manser, A.G.R. & Keeling A. A. (1996) *Practical Handbook of Processing and Recycling Municipal Waste*. Lewis Publisher.

"A Simple & Nondestructive Technique for Measuring Plant Growth & Development." The American Biology Teacher. http://www.nabt.org/sub/htdi/s2a, accessed August 1, 2008.