

In Vessel Composting of Urban Solid Waste

By

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Master of Science in Engineering



Research work supervised by

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Declaration

This thesis is a report of research work carried out in the Department of Chemical & Process Engineering, University of Moratuwa, Sri Lanka between September 2002 and July 2004. The work included in this thesis is part or whole has not been submitted for any other academic qualification at any institution.

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Abstract

Solid waste is the most critical and visible pollution stream in Sri Lanka. As many developing countries urban solid waste in Sri Lanka consists with high organic and wet solid waste. Studies on solid waste show that about 81% of the total waste consists of organic solid waste. Organic waste can be composted and it is clear if organic waste issue is addressed the major part of the sold waste component will be automatically addressed.

Above statistics show that the major component of any sustainable solid waste management plan should be organic waste treatment.

However in Sri Lanka composting is not a popular option for solid waste. There are many reasons behind it. Some of them are long lead composting time, low quality of the final product, mixed solid waste, lack of funds, technical problems in composting, less availability of expertise, etc.



Under this background there is a need of sustainable composting system which is suitable for high organic urban solid waste while answering the drawbacks of the present composting systems. This research aims to answer that timely and growing problem.

Since composting is happened as a result of microbiological activities, by optimizing the factors for microbiological activities composting process can be optimized. This is the fundamental argument in this research.

BIOCOM-MSW composting system(the method which is introduced by this research) consists of relevant equipment for semi automation system, with a major component of drum reactor. The strategies are used to maintain a high composting process are controlling C:N ratio, moisture content, particle size, rotating speed and rotating time. It is aimed to maintain the thermophilic stage of the composting throughout the composting process.

Final outcome of the research shows through this new attempt, after three days it is possible to obtain a stable product from organic solid waste. It can be identified that the waste has gone through a rapid stabilization. Result of this research shows that it can be introduced in two major practical implementations. They are as follows;

1. Rapid organic waste stabilization
2. Rapid pretreatment in sanitary land filling instead of biological pretreatment

In present back ground, export and local market consist with an increasing demand for organic foods, especially for fruits, vegetables and tea. According to that there is an increasing demand for organic fertilizers.

It is a timely need of the country to identify a solution for organic solid waste not only in the point of environment and health but also in the point of view of economic and agricultural sector development.

Out come of this research has already identified as a national priority by the ministry of industries, tourism and investment promotion. Ministry has identified this research as one of the project among the six for the implementation in next five years. Presently ministry seeks for foreign funding through the external resources department of the ministry of finance and planning.

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