


## 学位論文の要旨

フリガナ 氏名	トリ ブディ プラヨゴ Tri Budi Prayogo 
専攻 入学年度	宮崎大学大学院農学工学総合研究科博士後期課程 資源環境科学 専攻 平成 21 年度 ( 10 月) 入学
学位論文 題目	Evaluation of Effect of Cover Soil Application on Leachate Quantity and Quality under the Tropical Climate Condition  熱帯気候条件での覆土の浸出水量・水質への影響の評価
<p>【論文の要旨】 (和文の場合1,200字程度、英文の場合800語程度)</p> <p>Over the years, many different factors have increased the pressures on municipal solid waste (MSW) management worldwide. Like other Asian countries, Indonesia has recently faced solid waste management problems, owing to insufficient landfill site with the leachate treatment plant, as well as the climatic conditions in this tropical country. Therefore, in Indonesia, there is a need for evaluative analyses to resolve these solid waste management problems in view of the conditions in each municipality, and to predict the leachate quantity and quality in consideration of current leachate treatment procedures; the findings could then be used as a basis for leachate treatment plant planning.</p> <p>The objective of this research is to evaluate the solid waste management of municipalities in Indonesia and to establish a method of predicting the quantity and quality of leachate according to the climatic conditions, in order to establish a useful basis for improving solid waste management performance and to develop leachate treatment plants in Indonesia.</p> <p>The first specific aim of this study is to survey and evaluate solid waste management problems in Indonesia, especially in municipalities with rapidly growing populations by the SWOT analysis method. The other aim is to predict leachate quantity and quality in landfills and to evaluate the effect of the application of top cover and intermediate cover on the quantity and quality of leachate.</p> <p>The SWOT analysis was conducted to evaluate the practice of MSW management in Indonesia, including the conditions of MSW management Indonesian municipalities with rapidly growing populations that are experiencing problems with such management. The intention of this study was to develop strategic action plans for improving planning by environmental and social-based SWOT analysis with a view to improving solid waste management systems in Malang Municipality, one of the rapid growing municipalities in Indonesia. The SWOT analysis showed that strategies to increase the government role, the participation of inhabitants, and landfill management conditions can be applied to increase the performance of solid waste management in Malang Municipality. One of the strategies connected to landfill management was the necessity of predicting leachate quantity and quality for the landfill site in the municipality in view of local conditions by a simple method.</p>	

Some experimental and modeling approaches were conducted to realize the goal of predicting leachate quantity and quality in the landfill. A serial batch experiment to investigate the effect of the water content of waste on the activity of microorganisms was conducted in order to identify suitable conditions to promote biological degradation. This was conducted by measuring the gas generation, which is an indicator of the degradation activity of several organic material samples. This study showed that the critical water content to promote biological degradation was 50%.

A serial column experiment was also conducted to determine the water content distribution in the landfill layers in the dry season. The results showed that the evaporation of waste occurred only in the top layer. The water content distribution in deeper layers was influenced by water movement. The result of the study was compared with the result of a field investigation in an actual landfill in Indonesia. The water content distribution at the end of the experiment was similar to that obtained in the field investigation.

Finally, a model for predicting leachate quantity and quality in Indonesia was discussed. The results from the batch and column experiments were applied in this model. The model was developed by the water balance modeling approach for daily prediction.

Cover soil application had reduced the annual amount of leachate by 1.2 times in the beginning and middle of the wet season, when dumping activity started, and by 1.6 times in the beginning and middle of the dry season, when dumping activity started, which were greater reductions than for landfill without cover soil. Intermediate cover soil held water in the waste for longer and distributed the leachate flow more evenly and with smaller variation compared with top cover soil. This showed that the application of cover soil was preferable to reduce the amount of leachate generated.

Recently, in Indonesia, the effect of applying intermediate cover soil has not been considered in calculations of leachate generation for leachate treatment plant design. Concerning the effects on the time to starting dumping and the low variation of generated leachate, intermediate cover soil application is one feature that can be used in leachate treatment plant design, and will be included in the Indonesian National Standards for the construction and operation of landfills.

- (注1) 論文博士の場合は、「専攻、入学年度」の欄には審査を受ける専攻を記入すること。
- (注2) フォントは和文の場合、10.5ポイントの明朝系、英文の場合12ポイントのtimes系とする。
- (注3) 学位論文題目が外国語の場合は日本語を併記すること。
- (注4) 和文又は英文とする。