

LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : PROSIDING

Judul Karya Ilmiah : Simulation sediment transport in development location of a diesel power plant using Computational Fluid Dynamic (CFD) methods
 Jumlah Penulis : 6 Orang (**E Yohana**, T S Utomo, V S Sumardi, D A Laksono, K Rozi, K H Choi)
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Analysis of land requirements of Temesi final disposal facility, Gianyar Regency with 3R waste management scenario

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Abstract. Based on waste generation projection in 2040, the total waste generation in Gianyar Regency was approximately about 1,208.88 m³/day from a total occupant of 593,436 inhabitants in Gianyar Regency. The existing supporting capacity of Temesi Final Disposal (Temesi Landfill) was 51,500 m³; meanwhile, the total waste generation in Gianyar Regency in 2020 is up to 146,356 m³ consequently Temesi Landfill was overloaded by untreated solid waste since 2020. To reduce waste generation and decrease the treatment burden in Temesi Landfill, solid waste management using 3R methods from household clusters needs to be applied. Using 3R concept, eventually, the waste generation that is disposed into Temesi Landfill can be reduced significantly by 63%, from 1,208.88 m³/day into 446 m³/day with a total weight of 148 tonne/day in 2040. Within the 3R waste management from households, the land requirement could be reduced to only 1.08 Ha in 2020 and 14.35 Ha in 2040 from previously about 3 Ha and 39 Ha. Within the forecast results, it is concluded that the upstream 3R scenario has a significant impact on reducing waste generation; thus, it will also lead to fewer landfill area demands.

1. Introduction

Like any other regencies/cities in Bali, Gianyar Regency faces identical waste disposal and management problems that firmly pollute the surrounding environment. In particular, during the holiday season, the volume of wastes tend to increase about third folds. The district government has taken various steps related to handling this waste. In addition to increasing public awareness in managing waste, Gianyar Regency also optimizes Temesi Final Disposal in Temesi Village with a total area of 4.5 hectares. Temesi landfill has been adopting a sanitary landfill method in order to process the untreated waste. However, Temesi has suffered severe overload since 2018 due to a significant increase in waste disposal after a sudden closure of Suwung landfill, followed by limited land available to perform proper sanitary landfill operations. Along with establishing the Government Law 18 (2008) concerning Waste Management, every regency in Indonesia must undergo complete waste management from its source. Efforts to manage waste can be done through Reuse, Reduce, and Recycle (3R).

There have been several studies that had been researching the Temesi landfill. However, it did not specifically mention the waste generation and landfill capacity. The impacts of solid waste in the water



Simulation sediment transport in development location of a diesel power plant using Computational Fluid Dynamic (CFD) methods

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Abstract. Research about Sediment Transport is important for the sustainability of coastal buildings. The infrastructure construction of the Halmahera Diesel Power Plant (PLTD) in the coastal area requires water supply as a cooling system. The supply of cooling water can be reduced because of erosion or sedimentation. This study uses CFD modelling of ANSYS FLUENT applications with variations in mass flow rates. The Eulerian-Lagrangian approach is used to predict the rate of erosion and accretion that occur around the place of Halmahera. Methods of Particle Size Distribution (PSD) numerical simulation is uniform. The simulation process results consist of particle mass, erosion, and accretion rate in the seabed. Variations in mass flow rates of 0.05 kg/s, 0.1 kg/s, 0.15 kg/s, 0.2 kg/s, 0.25 kg/s obtained the erosion rate respectively 5.425×10^{-7} mm/year, 1.085×10^{-6} mm/year, 1.626×10^{-6} mm/year, 2.170×10^{-6} mm/year, 2.712×10^{-6} mm/year. The result of the accretion rate obtained from the variation in mass flow rates is 301.43 mm/year, 602.87 mm/year, 904.30 mm/year, 1205.50 mm/year, 1507.77 mm/year. From this research. The result of simulation to be important to predict the rate of sediment transport for consideration in the development location of construction Halmahera PLTD.

1. Introduction

A natural process that often happens in the coastal area will have resulted in sediment transport. These conditions will result in accretion and erosion. Sedimentation or erosion across the coastline will have impacted the form of coastal buildings (ex: pier, jetty, wave breaker, groin, artificial sea wall, etc.). Halmahera East Ternate island is a specified location for Diesel Power Plant Construction (PLTD). The diesel power plant is usually used for fulfilling the electric in low capacity, new isolated place, village, and industrial needs. The diesel power plant needs a huge water consumption for its cooling system. The lack of water needs for cooling system because of sediment transport, will prevent diesel power plant to work properly [1]. The research uses the data from the temporal change of shoreline that needs expensive cost and longtime research so that simulation needed to be efficient processes [2].

Research about sediment transport conducted by Javaherci and Aliseda (2017) used Discrete Random Walk (DRW) method on simulation to obtain sediment transport rate which marine hydrokinetic turbine



Construction of co-culture of microalgae with microorganisms for enhancing biomass production and wastewater treatment: a review

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Abstract. The development of microalgae cultivation in wastewater has been explored for years. Several wastewaters and nutrient sources related to biomass generation have been combined in recent years. On the other hand, several factors seem to reduce the possibility of industrialized this concept shortly. The growth rate and harvesting cost of the algae are often pointed as the leading cause of the gap for industrialization of this concept. In order to counteract these problems, constructing microalgae in the form of co-culture consortia with microorganisms, such as bacteria and yeast, have been reported to enhance the production of biomass under a short period of cultivation. This review highlights the strategies to combine microbial strains and microalgae for improving the process of biomass generation based on the comparison of the productivity of single and consortium of microalgae cultivation. Subsequently, mechanisms to enhance microalgae growth are scrutinized based on their interaction. Furthermore, critical factors regarding the construction of the consortia are discussed. Eventually, identifying gaps in this concept is displayed to describe the path of future focuses in this potential field.

1. Introduction

Microalgal biomass generation currently gains more attention since it has many possibilities to apply on an industrial scale and versatile applications [1]. Biomass products for secondary metabolites, lipid, and more fuel products are among the application of microalgae [2-4]. Low water footprint and higher productivity are mentioned as the advantages of microalgal biomass compared with terrestrial biomass from the crops and forests [5].

As microalgae cultivation faces nutrient source problems, coupling the cultivation with wastewater treatment rises as a promising method to grow the algae alongside the wastewater treatment process [6]. The high nutrient content of wastewater and the demand to remove the nutrient creates an opportunity to apply microalgae in the wastewater system to remove nutrients effectively [7]. At the end of this process, the outcomes are the biomass of algae and recovered water [8]. Production and harvesting processes are the most burdening factors for biofuel generation from microalgae [9]. The sequential process of flocculation and/or filter can only lead to the negative balance of the capital cost for such renewable energy [10]. Thus, many alternatives and solutions have addressed this barrier to reach biodiesel's feasibility generated from algae.



Bibliometric analysis of the study on exposure evaluation to aerosol nano or ultrafine particles in the breathing zone

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Abstract. To map the advancement of exposure evaluation research for particles less than 100 nm in the breathing zone, we developed a bibliometric analysis using VosViewer 1.6.15 by collecting relevant publications from Scopus on August 10th, 2020. Of 769 relevant documents, 90.64 % (n = 697) came from the journal and used English as the language that started to be published in 1985. The results showed that research themes have grown on the three clusters related to inhaled nanoparticles exposure measurement, responses and effects, and their primary existence in consumer products. Moreover, depth analyses by visualizing maps of the top active countries, authors, and top-cited documents on the citation, co-citation, or co-occurrence have revealed several essential pieces of information on this research area. Our findings suggest that the greater depth on appropriate devices for exposure measurements, particularly in nano-sized, which matches with the metrics were needed. Through these efforts, the capabilities of analyses can improve for future inhaled nanoparticles exposure assessments.

1. Introduction

Regarding the development of nanotechnology, nanomaterials' use implies that the risks of particle less than 100 nm had spread to large environments, from workplaces as the production site until consumers in many forms of product. Previously, the sources of the general size-segregated particles from the combustion activities have also played as the contributors to the emission of nano or ultrafine particles, such as forest fires, volcanic eruptions, industrial chimneys, the exhaust of vehicles, and kitchens. Therefore, studies on the health effects of nano-sized particles have been extensively developed in the last two decades with nanotoxicological knowledge's critical role to comprehend the responses and make the adverse impacts identified in a more broad aspect [1-3]. Regarding the health and environmental risks, nanotechnology products, as the new contributors of nano-sized particles with combustion activities previously, need to concern for sustainable principles. While, the particulate matter in their size-segregated forms has been known can increasing respiratory morbidity and mortality [4,5].

Compared to the larger particles, nano-sized particles had more deposition rate to cross the pulmonary epithelium and reach the interstitium, which can be systematically distributed into the bloodstream to increase the possibility of increasing the level of inflammation [6,7]. Therefore, future effects of nano-

