

## Accepted Manuscript

Slow release fertilizer preparation from sugar cane industrial waste

Chandra Wahyu Purnomo, Andi Respito, Eva Pramuni Sitanggang, Panut Mulyono



PII: S2352-1864(17)30313-9  
DOI: <https://doi.org/10.1016/j.eti.2018.02.010>  
Reference: ETI 211

To appear in: *Environmental Technology & Innovation*

Received date: 23 September 2017

Revised date: 23 February 2018

Accepted date: 24 February 2018

Please cite this article as: Purnomo C.W., Respito A., Sitanggang E.P., Mulyono P., Slow release fertilizer preparation from sugar cane industrial waste. *Environmental Technology & Innovation* (2018), <https://doi.org/10.1016/j.eti.2018.02.010>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## SLOW RELEASE FERTILIZER PREPARATION FROM SUGAR CANE INDUSTRIAL WASTE

Chandra Wahyu Purnomo<sup>1,2,\*</sup>, Andi Respito<sup>1</sup>, Eva Pramuni Sitanggang<sup>1</sup> and Panut Mulyono<sup>1</sup>

<sup>1</sup>*Advanced Material and Sustainable Mineral Processing Research Group, Department of Chemical Engineering, Universitas Gadjah Mada, Yogyakarta, Indonesia.*

<sup>2</sup>*Agro-technology Innovation Center PIAT, Universitas Gadjah Mada, Indonesia*

\*corresponding author (chandra.purnomo@ugm.ac.id).

### Abstract

Bagasse fly ash is used for preparing slow release fertilizer as the matrices for nutrient storage with molasses as the binder. The two type of commercial fertilizers i.e. ZA (ammonium sulphate) and KCl are mixed with BFA and pressed into a cylindrical pellets. The effect of drying temperature and pelleting pressure on the release behaviour of the two nutrients are observed using a sand bed leaching test. The variation of the processing parameters which altering the pellet porosity are significant in the release of nitrogen but minor for potassium release.

**Keywords:** bagasse fly ash, slow release fertilizer, molasses.

### I. Introduction

Utilization of solid wastes such as biomass residue (Hazzaa and Hussein, 2015) and municipal solid waste (Valdes et al., 2016) recently become a major concern worldwide. The effort has two major benefits which are reducing the quantity of waste and in the same time preserving the natural resources. Bagasse fly ash (BFA) solid waste from a cane sugar industry is an abundant renewable resources with lack of commercial utilization. This material contains mostly carbon and silica with some trace metals content which highly varied from one to the other industry depend on the combustion systems. It was previously reported that the material has great potential for preparing several advanced materials (Purnomo, 2013; Purnomo et al., 2012). On the other hand, molasses as the wastewater from sugar crystallization stage due to its tacky and high viscous characteristics can be used for binding agent. This two types of waste can be highly beneficial if can be reused for the sake of the industry.

The cane plantation usually requires two to three times of conventional fertilizer application from the early cultivation to the harvesting time with several fertilizer types mainly nitrogen and KCl. This common practice method requires intensive labour forces and high fertilizer cost. This practice can be improved by the

Download English Version:

<https://daneshyari.com/en/article/8858013>

Download Persian Version:

<https://daneshyari.com/article/8858013>

[Daneshyari.com](https://daneshyari.com)