PRODUCTION OF CARBOXYMETHYL CELLULOSE (CMC) – CAT LITTER PELLET

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ABSTRACT

The purpose of this study is to determine the characteristic and affect of clumping agent which is carboxymethyl cellulose with nonionic bio surfactant in cellulose. Cellulose replaced chemical based cat litter pellet. As world is concern about the environmental issues, researchers tend to find alternative ways to replace nonrenewable sources which is chemical based cat litter pellet with cellulose. This is because the cellulose are environmental friendly as it is made from palm based. Unfortunately, cellulose has its own disadvantages which is it does not have the ability to clump with CMC. Most of the cat litter are made from both clay and silica based which also have several disadvantages such as high cost, cannot be decompose and also are not recommended to be flushed into sewage system and landfill. The general requirement for cat litter is it can wetted with urine and absorbs all the moisture absorption. In this experiment the material that are under studied are CMC and bio surfactant. Carboxymethyl cellulose used in this experiment is made up from oil palm empty fruit bunch (OPFEB). One type of bio surfactant used in this experiment is known as nonionic bio surfactant which is Tween80. Tween80 is used to improve the odor control and carboxymethyl cellulose as a clumping agent. There are 16 samples with different formulation ratio used in the clumping and hydration capacities tests for producing biodegradable cat litter. Based on the results, it appears that cellulose which made up from palm absorbed slightly more water and has a potential to be used as commercial cat litter. As a conclusion, the formulation ratio 1:1 for each volume of solution gave adequate clump strength and nice clumping as it would allow the cat owner to remove soiled clumps easily from a litter box without removing excessive amounts of unsoiled litter.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.0 Research Background

Nowadays, among household popular pets throughout the world is the domestic cat which can be found in every place where people lived. Each day the average cat produce approximately 3 lbs. of fecal waste (Seemann & Rose, 2015) which give the annual fecal production of over 1.18 million metric tons (Dabritz, 2010). For this reason of the highest, there are many type of cat litter commercially available since 1940s to cater the high production of fecal waste.

One of the options for the best cat litter pellet is from biodegradable sources rather than clay-based and silica-based. Normally, animal litter which come from biodegradable sources consist of a variety of materials including sawdust, wheat, alfalfa, oat hulls, palm, corn cobs, peanut hulls or recycled paper waste (Steven F.Vaughn, Mark A.Berhow & Edward Lee, 2011). In this study, cat litter pellet which made from palm based has been investigated. It does not contain any chemical additives and also give good odor control. Besides that, it is also dust free and non-toxic which can provide a healthier environment. Unfortunately, palm based cat litter do not clump easily and make it difficult to scoop.