

UNIVERSITI TEKNOLOGI MARA

**THE DEVELOPMENT OF
SUGARCANE BIOCOMPOSITE FOR
HOUSEHOLD PRODUCT DESIGN
APPLICATION**

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Thesis submitted in fulfilment
of the requirement for the degree of Master of
Master of Art and Design

Faculty of Art & Design

May 2019

ABSTRACT

“Saccharum Officinarum” or **(yellow cane)** contributes to mass food production industries. The use of this plant had become popular for mass production, for example in raw sugar and juice production in Malaysia and the disposals of sugarcane produces two-component that are bagasse and pith (BP). Unfortunately, BP had become an issue due to the increased use of bins. As BP biocomposite has potential in design use especially for mass manufacturing of product application hence this will reduce the number of bins used for disposal purpose. In Malaysia, BP biocomposite potential in mass manufacturing has been identified such as for producing flat particleboard. Moreover, several BP biocomposite areas of use in mass production for industry design manufacturing area namely automotive component, toys manufacturing, packaging design, and product application production. In addition, examples of the technologies applied to manufacture process in the large-scale factory are hot press, injection moulding, and cool press. A new development besides these three processes is using Hot Air Moulding Template (HAMP), which is suitable for use in manufacturing household craft using BP biocomposite. Furthermore, laboratory tests are conducted, for example on water absorption, thickness swelling, and flexure test. As an expected outcome, this BP biocomposite can use as a potential towards of product design application. These will be referring to Life Cycle Assessment Framework (LCA) as a guideline on BP biocomposite mass manufacturing for household craft product application before it will be ready to be produced.

ACKNOWLEDGEMENT

Most of all thanks to Allah and UiTM Shah Alam for inviting me to the faculty of Art & Design, Department of Industry Design, for me to pursue my studies in the field of Master Research course. Many thanks to Dr Mohammad Azroll Ahmad, Dr Shahril Anuar Bahari, Assoc. Prof. Ing. Dr Ing-. Oskar Hasdinor Hassan and Dr Haszlin Shahrudin, as pillars that guide me in continuing my master level. Also in recognition are personnel from the other streams: such as, from the Faculty of Applied Science from UiTM Shah Alam.

The contribution from Applied Science that filled the need required for me in search for more information and let me use several mechanical machines and chemicals required for the manufacturing of BP biocomposite as household product application. Most of all, to my mother, brother and sister who always pray and gave me the strength to carry on with my journey to achieve my ambition.

TABLE OF CONTENTS

	Page
CONFIRMATION BY PANEL OF EXAMINERS	ii
AUTHOR'S DECLARATION	iii
ABSTRACT	iv
ACKNOWLEDGEMENT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	xii
LIST OF FIGURES	xv
LIST OF SYMBOLS	xxiii
LIST OF ABBREVIATIONS	xxv
CHAPTER ONE: INTRODUCTION	1
1.1 Background of Study	1
1.2 Manufacturing in Biocomposite Production	2
1.3 Potential of Sugarcane	3
1.4 The Context in Household Product Application and Product in Biocomposite	4
1.5 Processing The Bagasse And Pith (Bp) Biocomposite	5
1.6 Problem Statement	6
1.7 Research Objective	8
1.8 Context and Scope of Research	9
1.8.1 Context	9
1.8.2 Significant Of Study	10
1.9 Aims and Research Question	11
1.9.1 Aims	11
1.9.2 Research Question	11
CHAPTER TWO: LITERATURE REVIEW	13
2.1 Overview of Main Rules of The Lean Manufacturing Process	13

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF STUDY

Sugarcane is a rapid growing plant usually grows near water for example pond, and drain. More than 45% of sugarcane bagasse and pith (BP) creates a problem in disposal after being crushed by the hawkers for its juice. Sugarcane juice is commonly sold by a hawker in Malaysia especially in night markets and roadside stalls as described by the researcher *“several collections in Cheras night markets had conducted on bagasse juice”* (Leang & Saw, 2011). The outer layer of sugarcane Pith can be peeled off using a peeler knife tool and for Bagasse it can be crushed using sugarcane crush machine that enables for this components turned into raw biowaste.

Referring to James (2007), this waste BP sugarcane had potential exchange into biodegradable waste material and he had used Life Cycle Assessment (LCA) through his experiment by analysing these three components. As highlighted (De Souza et al., 2015) this green plant contain *“sucrose”, “lactose”, “fructose”* and another component that can be treated with the chemical.

Based on Malaysian Agricultural Research and Development (MARDI) they believe, *“Malaysia has 146 genetic cloned canes, used by a hawker in different states and used in mass biocomposite production”* (S.LTan, 1989).

This is also cited in Robeson (2014), *“ a none copolymer chemical natural treated substance capable used as a component to loose “lignin” and the measurement mixing adhesive is important in manufacturing natural biocomposite”* (Robeson, 2014). Review by these four scholars, the measurement weight used for manufacturing BP biocomposite it is important to analysed and recorded referring in LCA through manufacturing for household product design application.

As explain by Wong (2007) stated in Conference on the Malaysian Economy: Development and Challenges *“a rapid growth green plant in Malaysia can improving and gaining in economically on the material is reusable takes as a material action into waste bio-product”*, (Wong, 2007). As stated through this research, this rapid