UNIVERSITI TEKNOLOGI MARA

METHODS OF FLAVOURING GAHARU TEA

MUHAMMAD DANIAL ARIEFF BIN MOHD GHAFOOR

Thesis submitted in partial fulfillment
of the requirements for the degree of
Bachelor of Engineering (Hons) Chemical

Faculty of Chemical Engineering

July 2019

ABSTRACT

Tea is one of the most consumed beverages in the world. While gaharu tea holds many benefits, the bitter taste makes it hard for consumer to drink this tea. Therefore this research objective is to study the best methods to flavour gaharu tea, the best flavour to infuse with the gaharu tea and the effect of adding flavour to antioxidant properties of gaharu tea. There are three methods of flavouring gaharu tea which is inclusion method, artificial flavouring method and mixture of both method. Inclusion methods is where chunk of dried fruits is added into the tea leaves and mixed together evenly. Artificial flavouring is where artificial flavours were sprayed on top of the leaves and mixed evenly. Lemon, strawberry and mint flavour are used in this experiment. Based on the DPPH assay, the scavenging activities for original gaharu tea is 85.43%. Lemon artificial flavouring methods indicates the highest scavenging activities which is 95.22%. Meanwhile, the pH of original gaharu tea is 6.30 which is neutral. Addition of lemon chunk makes the tea acidic which lowers the pH to 3.00. Flavour test was conducted among 20 participant to find out the best flavour. They were required to try all the tea with different flavour and different flavouring methods. The most favourable flavour is lemon flavour and the best method in flavouring gaharu tea is mixture of inclusion and artificial flavouring method.

ACKNOWLEDGEMENT

Firstly, I wish to thank God for giving me the opportunity to embark on my degree and for completing this long and challenging journey successfully. My gratitude and thanks go to my supervisor Miss Habsah Alwi

My appreciation goes to the Captain and crewmembers of the faculty of Chemical Engineering who provided the facilities and assistance during sampling. Special thanks to my colleagues and friends for helping me with this project.

Finally, this thesis is dedicated to my loving father and mother for the vision and determination to educate me. This piece of victory is dedicated to both of you. Alhamdulillah.

TABLE OF CONTENT

		Page
CONFIRMATION BY PANEL OF EXAMINERS		**ii**
SUPERVISOR'S CERTIFICATION		**iii**
COORDINATOR'S CERTIFICATION		**iv**
AUTHOR'S DECLARATION		**v**
ABSTRACT		**vi**
ACKNOWLEDGEMENT		**vii**
TABLE OF CONTENT		**viii**
LIST OF TABLES		**xi**
LIST OF FIGURES		**xii**
LIST OF NOMENCLATURES/ABBREVIATIONS		**xiii**
CHAPTER ONE INTRODUCTION		**1**
1.1	Process Background	1
1.2	Problem Statement	2
1.3	Objectives	2
1.4	Scope of Research	2
1.5	Significance of Research	3
CHAPTER TWO LITERATURE REVIEW		**4**
2.1	Introduction	4
2.2	Gaharu	4
	2.2.1 Overview	4
	2.2.2 Benefits of Aquilaria	7
2.3	Tea	8
	2.3.1 Overview	8
2.4	Type of tea	8
	2.4.1 Green Tea	8
	2.4.2 Black Tea	10
	2.4.3 Oolong Tea	10

CHAPTER ONE
INTRODUCTION

1.1 Process Background

Tea is a drink derived from the extract of tea plant (*Camellia Sinensis*) and it is considered as the second most widely consumed beverage after water due to the great benefits it offers (Lau et al., 2018). Tea is a type of phytotheraphy as despite of its pleasant aroma and flavour, it also has nutritional properties, reduce cancers, boost immunity and enhance the heart functionality. Generally, the manufacturing process of tea will determine the type of tea and widely known types are green tea, black tea and oolong tea (Panigrahi et al., 2016). Besides that, tea is also categorized by the different type of plant used, part of the plant used and the location of the production. Therefore, many type of tea emerges from various plant and herbs used and each tea has its own specialty whether in taste, aroma, functionality or its nutritional properties. Chemical constituents of tea consist of polysaccharides, sterols, amino acids, various vitamins, minerals, proteins, organic acids and volatile compound (Xiao et al., 2011).

Besides the consumption of pure tea, flavouring are also added to improve the fragrance and flavour of the tea. The flavour of tea can be divided into two categories which are aroma (volatile compound) and taste (non volatile compound)(Ho et al., 2015). Other plant or fruit extracts such as rose (*Rosa Rubiginosa*), lemon (*Citrus Limon*) and strawberry (*Fragaria* × *ananassa*) are added to create new aroma and taste for the tea. There are countless possibilities to flavour tea in order to create new exciting beverage while maintaining the magnificent properties of tea.

Agarwood tea is a tea produce from the leaves of Agarwood plant in genus *Aquilaria*. Agarwood has many applications such as perfumery, incenses, medicine, religious ceremony and ornamental (Lee et al., 2016). Agarwood demand is very high in the market despite the high price. In order to harvest Agarwood, it is important to wait for the plant to mature first, which will usually take five to seven years. Between these time, farmers opt to