

## Chapter 1

### Introduction

#### 1.1 Problem Background

Cold brewing is an alternative take to conventional hot brewing methods. The cold brew method utilizes continuous low temperature treatment to extract the flavor compounds. Since the flavor extraction happens at low temperature, this allows for the cold brew method to preserve the overall quality of the ingredients constituent by lowering the potential damage towards volatile content as low temperature treatment meant that it is unlikely for the constituents to be oxidized by heat. The lack of heat also influences the degree of flavor development, since most flavor developing reactions such as Caramelization or Maillard reactions require heat, the cold brewing method will allow for new flavor profiles to be developed. Currently, the cold brew method has been applied commercially to the public to ready-to-drink tea and coffee beverages. This study aims to instead use Cocoa as the ingredient due to its similar aptitude as a drinking beverage.

The Earliest form of drinking cocoa was developed by the Olmecs, the modern word “chocolate” originate from *chocolatl*, which translates into “hot water,” and *cacahuatl*, which referred to the bitter beverage made with cocoa that was shared during religious ceremonies. Both are translated in Nahutl language Cocoa, also known as *Theobroma cacao*. Nowadays chocolate is a popular ingredient to create foods from chocolate bars to drinks like hot chocolate.

Cocoa production is focused mainly in tropical regions due to having optimal heat and soil quality which favors the bean development. As such it would be beneficial that nations with large agricultural resources such as Indonesia to develop new products or applications for the wide variety of high quality produce that we are able to grow. From (FACT.MR. 2018) shows that the CAGR (compound annual growth rate) of cocoa shows promising growth. With the rise of demands for cocoa, suppliers from all over the world compete to produce cocoa products- this includes the variety of Cocoa bean products such as Cocoa nibs, fermented cocoa beans/Nibs, and beverage chocolate. The current trend in cocoa market is the cocoa producers are located in developing countries, while the cocoa product development was done by developed countries such as the US, (Nabhani, I., et, al. 2015).

Indonesia was one of three largest cocoa producers back in 2010, the potential for Indonesia to compete in the global cocoa market can be seen in the total cocoa production reaching 450 megatons

in 2014, and 593 megatons in 2015 (Ditjebun,2016). However, the production rate has shown significant depression over the years, despite having advantage in agricultural resource. There are several factors which may cause the reduced proficiency of cocoa production in a certain area. As stated by the study from [Ditjebun,2016], five major cause which may heavily influence cocoa yield is the cocoa tree age, unfavorable weather, dominance of low yield fields, improper pest control, and resource management. The study of Abdullahi et al., 2018 mentions that most cocoa producers are small farmers, and with the higher standard demands for the cocoa beans from their investor. With the producers are unable to keep up with the trend, they have begun to move on to more promising sector such as palm oil and rubber. In light of this issue, this study aims to suggest the cold brewing method as a method to gain the farmers interest to continue the cocoa bean production and development of a RTD (Ready to drink) product which may allow quick income.

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Health has also shown to influence food diet. [Cocoa is known to promote various health benefits thanks to the constituents. The usage of cocoa's health potential has been identified since the age of the Aztec kings, they mention the cocoa to have aphrodisiac like properties. (Scapaginini, G et al., 2014). This effect may be correlate to the fact that Cocoa ]contain high amounts of polyphenol per serving compared to several other ingredients, the majority of the polyphenols are classified as flavonoids: the major flavonoids which influence health performance the most includes + Catechin, - epicatechin (Both monomer and oligomer type) and B-type procyanidin. (Katz D. L et al., 2015). The flavonoids also have resistance towards the gastric environment of our digestive system which allows easier absorption towards the intestine and entrance towards the bloodstream without significant alteration towards performance and properties of the constituent.

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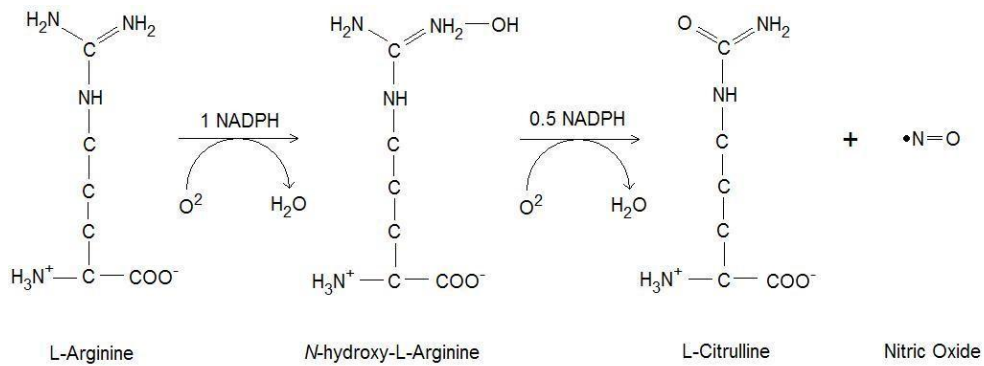
Several studies tested the effects on the daily intake of cocoa drinks. Most shows that cocoa diets manage to reduce the prevalence of high blood pressure. The study held by (Hollenberg, N. K et al .,2009). analyzed the influence of Flavonol and Nitric Oxide (NO) towards the mortality rate of the [Kuna] tribe through the daily diet of cocoa drinks. The study concludes that there is significant reduction in the prevalence of heart diseases, cancer and diabetes after the diet. The cause behind this antihypertensive effect is thought to be the cocoa flavonols which are able to influence NO availability in the human body (Katz, D. L et al ., 2015) (Fraga,C et al.,2011) ). NO is a compound which can be found in mammals, formed from Nitric oxide(NO) synthase which catalyze the L-arginine to

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initiate the process, which can be seen in **Figure.1**. NO is responsible for initiating Guanylyl cyclase, later cause dephosphorylation of GTP to cGMP results in the removal of NO, which triggers the transfer of signal for smooth muscle relaxation and vasodilation of blood arteries. (Fraga,C. et al.,2011).



**Figure 1** Nitric oxide synthase (Source: Badrie, N.et al. 2015,).