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## Fungi Level Analysis of Cocoa Beans Based on Fermentation Box Type and Duration

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### Abstract

In certain location, it is undeniable that there are qualities variations of fermented cocoa beans depend on processing techniques. In addition, its cocoa bean's production central at Yogyakarta have their specific characteristic own regarding the use of fermentation box (box type). The purpose of this research was to analyze the effects of three types of fermentation box and duration to fungi level of fermented cocoa beans. CRD (completely randomized design) with two factors and three replications is applied as assessment method. The first factor is the type of fermentation box (basket, storey box and single box with a hand crank) and the second factor is the length of fermentation time (3 and 5 days). The result of the research explained that the lowest levels of the fungi achieve within 5 days of fermentation processes. Meanwhile, a single box with a hand crank provide the lowest of fungi's level. Furthermore, the combination of those two results may give the most favorably expected condition of fungi level.

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*Keywords:* fermentation box types, duration, fungi levels, basket, storey box and single box with a hand crank.

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### INTRODUCTION

Fermentation is the core of processing cocoa beans [20]. The purpose fermentation process is remove the pulps from cocoa beans and turn off the cocoa beans, improve and establish odor and distinctive flavor of chocolate and reduce bitter taste. The fermentation process can be done in three ways, namely using a box, in a pile, and in the

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basket [9].

The factors that influence the fermentation process include length of fermentation, speed of fermentation, size piles of cocoa beans, the reversal, aeration and weather [5]. The determination of cocoa bean fermentation distinguished on several things, among others varieties of cocoa, size of the cocoa beans, quantity fermented cocoa beans. In some countries, the fermentation is divided into two groups, i.e. groups with a long fermentation 2-3 days and 6-8 days. Generally, varieties of *Lindak* (the cocoa beans from cocoa plants Criolo and Trinitario types and the results of its cross) that fermented for 5-7 days, whereas for the cocoa varieties *Mulia* (the cocoa beans from cocoa plant Forastero type) requires shorter fermentation time, which is 3 days.

In addition to duration of fermentation, fermentation box type affecting the fermentation process itself and to the quality of fermented cocoa beans are produced. The fermentation box type influence fermentation aeration during the lasted. Aeration is the processing that encourages the changes that will lead to the death of cocoa beans. Good aeration will provide a more well fermentation. Mass amounts of fermented cocoa beans, container shape and size, surface area, thick pile of cocoa beans, container ventilation, and number of reversals determines good or not aeration

This research purposes to identify the fungi level on some fermentation box type and duration (three and five days). Gunungkidul and Kulonprogo is the highest cocoa producing areas in Yogyakarta. Each region has different habits in using fermentation box. The fermentation box types are the basket (the fermentation box that being use commonly in Gunungkidul, storey box (Kulonprogo) and single box with a hand crank (introduction fermentation box). This is important, because each fermentation box type drive a quality range of cocoa beans. These results are expected to identify which boxes and duration providing the lowest fungi level contaminant. Whereas, the benefit of this study is produces an efficient box design for better fermentation process with fungi levels low.

## MATERIALS AND METHODS

The raw material that being used in this research are *Lindak* Varieties which supplied by designated targeted farmer from Kulonprogo and Gunungkidul area. The number of cocoa beans will be based on the capacity of fermentation containers. This study carried out within one year (January – December 2012) in cocoa central of Yogyakarta.

Primary equipment in the fermentation is fermentation box. There are three types of fermentation box are used in this study, namely basket, storey box, and a single box with a hand crank. While fermentation support tools used are plastic sacks, thermometer, bucket, *rogen*, and drying racks. The capacity of each box is 40 kg (single box with a hand crank), 20 kg (basket), and 60 kg (storey box). The process of cocoa fermentation refers to the Research Centre of Coffee and Cocoa (*Puslit KoKa*) procedure [Fig 1.].

This study was conducted using a completely randomized design, two factors and three replications. The first factor is the type of fermentation box (basket, storey box and single box with a hand crank) and the second

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