1 INTRODUCTION

1.1 Background

Deodorization is one of processing unit in the palm oil refinery facilities. This unit serves to deprive the unwanted odor of Bleached Palm Oil (BPO) and separates BPO into Refined Bleach Deodorized (RBD) and Palm Fatty Acid Deodorized (PFAD). Deodorization process also reduce volatile compound such as Free Fatty Acid (FFA) and sterol (steroid alcohol or mostly known as cholesterol) [1].

Deodorization unit also gives a high contribution on the inefficiency of the entire refinery facilities [2]. Within a certain time, deodorization unit should be able to maintain quality and quantity of the product, maintain efficiency of equipment and maintain effective energy consumption.

One of the action needed to achieve those objective is to identify the current performance of the equipment on the unit. There are several methods could be used to analyze the performance of thermal equipment as shown in Table 1.1.

Table 1.1 Performance analysis methods [3]

Methods	Advantages	Shortcomings
Pinch analysis	• Can incorporate with other complimentary methods • Can be applied into complex industrial sites	
Applied mathematical programing techniques		• Only cover small part of total problem of the synthesis in process industry
Exergy analysis	• Can be used as an early stage in a development of a new process	• exergy is not subject to a conservation law (except for reversible processes)

Methods	Advantages	Shortcomings
Exergy analysis	• exergy efficiency permits to evaluate the degree of perfection of the considered process	

Based on the comparison provided in Table 1.1, exergy analysis selected to be used as the method to evaluate the performance of thermal equipment in this study. This is because exergy analysis does not only appear in recent study but also a comprehensive tools to evaluate inefficiency of the process and propose hints to reduce inefficiency [3].

1.2 Objective

Objective of this study is to analyze the deodorization unit in palm oil refinery using the exergy method.

1.3 Outcome

Upon completion of the thesis, there will be information about the current efficiency of the thermal equipment and on which equipment is the most inefficiency occur.

1.4 Scope

Focus of the thesis is on exergy analysis of deodorization unit in a palm oil refinery in Padang, West Sumatera. Condition of the system is in steady state with vacuum heat exchanger, process stripper, deodorized unit and spiral heat exchanger as the main component. No leaked in the system assumed. Pressure drop, potential exergy and kinetic exergy are negligible.

1.5 Outline

This thesis were written in five different chapters. Chapter one is introduction. This chapter describes the foreword of the study. Chapter one consist of background, objective, outcome, scope and outline of the study. Chapter two is review of related literature. This chapter describes the concept of crude palm oil (CPO) refinery and concept of exergy. Chapter three is methodology. This chapter describes the stages

of the study. This chapter divided into assumption and streams record, equation derivation, algorithm for exergy calculation, and a glance of exergy analysis.

Chapter four is findings and discussions. This chapter present the result of exergy calculation and discussion of exergy analysis. Chapter five is conclusion. This chapter conclude the study and add recommendation for further research.