PERFORMANCE EVALUATION OF NATURAL CONVECTION CACAO ROASTER

MARIVIC E. VIADO

Department of Engineering and Agro - Industrial Technology

DON SEVERINO AGRICULTURAL COLLEGE

Indang, Cavite

April 1991

PERFORMANCE EVALUATION OF NATURAL CONVECTION CACAO ROASTER

An Undergraduate Thesis

Submitted to the Faculty of the

Don Severino Agricultural College

Indang, Cavite

In Partial Fulfillment of

the Requirements for the Degree of

Bachelor of Science in Agricultural Enginnering

(Major in Crop Processing)

MARIVIC E. VIADO

April 1991

ABSTRACT

VIADO, MARIVIC Y ERSANDO. Don Severino Agricultural College, Indang, Cavite, April, 1991. "PERFORMANCE EVALUATION OF A NATURAL CONVECTION CACAO ROASTER." Adviser: Engr. Jaime Q. Dilidili.

The study was conducted at Indang, Cavite to determine the roasting time of the machine at different loads and to know the problems associated within the system of operation of the machine.

Performance of the machine was evaluated using different loads of cacao beans. These were 10 kilograms, 20 kilograms and 30 kilograms.

Statistical Analysis showed that the roasting time, fuel consumption and weight of roasted beans differe significantly on quantity of beans roasted.

Results showed that 30 kilograms of cacao beans were roasted in 7.05 hours. It consumed 7.56 kilograms of fuel and the roasted weight is 29.57 kilograms. The twenty (20) kilograms of cacao beans had a roasting time of 5.19 hours. its fuel consumption was 6.42 kilograms and the roasted weight was 19.63 kilograms. Finally, the 10 kilograms cacao beans were roasted in 4.25 hours with a fuel consumption Of 5.34 kilograms and 9.81 kilograms of roasted beans.

The machine has an initial investment cost of ₱ 3,852. The annual net income is ₱ 1,087.98 per year. The payback period is 3.24 years and breakeven point is 343.13 kilograms per year.

The problems encountered in the operation were: frequent feeding of fuel, accumulation of ashes in the middle portion of the burners and burning of cacao beans adhered to the surface of the triangular plates.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDIX TABLE

PERFORMANCE EVALUATION OF NATURAL CONVECTION CACAO ROASTER[1/]

Marivic E. Viado

[1/] An undergraduate thesis presented to the faculty of the Don Severino Agricultural College, Indang, Cavite in partial fulfillment of the requirements for the degree of Bachelor of Science in Agricultural Engineering (BSAE), major in Crop Processing. Contribution No. A.E.91039-015. Prepared in the Department of Engineering and Agro-Industrial Technology under the supervision of Engr. Jaime Q. Dilidili.

INTRODUCTION

Cacao, botanically known as Theobroma cacao L., was introduced to the country as early as 1670. Since then, it has been produced in the country for export purposes. (Penalba, 1982).

The crop being a non alcoholic beverage is commonly used in preparing delicacies like chocolates, candies, ice-cream and desserts and is special for making cosmetics (Ersando, 1986).

The cacao plant is proved to be well adopted to the local condition. It thrives best in an elevation of 1,000 meters above sea level and temperature that does not drop below 21^{o}C (PCARRD, 1979). It takes 3 to 5 years before cacao bear fruits. The pods are harvested 170 days from pod