

# **DRYING CHARACTERISTICS AND QUALITY CHANGES OF MORINGA AND NEEM LEAVES**

**By**

**AYA EZZAT SAAD MOHAMED**

**B.Sc. Agric. Sci. (Agricultural Engineering), Fac. Agric., Cairo Univ., 2011**

**THESIS**

**Submitted in Partial Fulfillment of the  
Requirements for the Degree of**

**MASTER OF SCIENCE**

**In**

**Agricultural Sciences  
(Agricultural Engineering)**

**Department of Agricultural Engineering  
Faculty of Agriculture  
Cairo University  
EGYPT**

**2016**



**SUPERVISION SHEET**

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**AYA EZZAT SAAD MOHAMED**  
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**SUPERVISION COMMITTEE**

**Dr. AHMED EL-RAIE EMAM SULIMAN**  
**Professor of Agricultural Engineering, Fac. Agric., Cairo University**

**Dr. YOSSRY BAYOUMY ABDELHAY**  
**Lecturer of Agricultural Engineering, Fac. Agric., Cairo University**



**Name of candidate:** Aya Ezzat Saad Mohamed

**Degree:** M.Sc.

**Title of Thesis:** Drying Characteristics and Quality Changes of Moringa and Neem Leaves.

**Supervisors:** Dr. Ahmed El-Raiez Emam

Dr. Yossry Bayoumy Abdelhay

**Department:** Agricultural Engineering

**Branch:** Food Processing Engineering

**Approval:** 18 / 8 / 2016

## ABSTRACT

The drying characteristics and quality changes of moringa and neem leaves were examined in this study in the laboratory of the department of agricultural engineering, faculty of agriculture, Cairo University and they examined by using artificial dryer, direct and indirect solar dryers. Three different drying air temperatures 40°C, 50°C and 60°C and three different air velocities 0.45 m/s, 1.00 m/s and 1.50 m/s were used by artificial dryer. The initial moisture content of moringa and neem leaves were 86.7 and 84% respectively and it decreased with the increasing of drying air temperature and air velocity. The drying rate was faster at the beginning than that at the end for all treatments. By using the artificial dryer, at drying air temperature 60°C with air velocity 1.5 m/s showed the best data, at which in dried moringa and neem leaves, the moisture content decreased to 9.35% within drying time 5.5 hours and 8.75% within drying time 10 hours respectively, the average drying rate was 14.06 and 7.525 %/h respectively, drying ratio was 4.42:1 and 4.04:1 respectively and the average evaporative rate was 28.13 gm<sub>water</sub>/h and 15.05 gm<sub>water</sub>/h respectively. Also, the quality tests of dried moringa leaves showed that, at air temperature 60°C with air velocity 1.5 m/s showed the best quality in terms of higher retention of protein and potassium, while at air temperature 40°C with air velocity 0.45 m/s showed the best quality in terms of higher retention of vitamin C and calcium. The quality tests of dried neem leaves showed that, at air temperature 50°C with air velocity 1.5 m/s showed the best quality in terms of higher retention of flavonoids. While, at air temperature 60°C with air velocity 1.5 m/s showed the best quality in terms of higher retention of tannins. By using solar dryers, the indirect solar dryer showed the best data, at which in dried moringa and neem leaves the moisture content decreased to 14.6% within drying time 13 hours and 16.9% within drying time 17.5 hours respectively, the average drying rate was 5.55 and 3.834 %/h respectively, drying ratio was 3.58:1 and 3.04:1 respectively and the average evaporative rate was 11.09 gm<sub>water</sub>/h and 7.669 gm<sub>water</sub>/h respectively. Also, the quality tests of dried moringa leaves showed that, drying by direct solar dryer gave the best quality in terms of higher retention of vitamin C and potassium, while drying by indirect solar dryer gave the best quality in terms of higher retention of protein and Calcium. The quality tests of dried neem leaves showed that, drying by direct solar dryer gave the best quality in terms of higher retention of tannins, while drying by indirect solar dryer gave the best quality in terms of higher retention of flavonoids.

**Key words:** Drying characteristics, Quality, Moringa, Neem, Solar dryers, Artificial dryer



## **DEDICATION**

*I dedicate this work, to my parents and brothers for  
all the support they lovely offered during my post-  
graduate study*





## *ACKNOWLEDGEMENT*

*Thanks and praise to the merciful Allah, who gave me the patience to conduct this research.*

*I would like to express my deepest appreciation to my supervisors **Dr. Ahmed El-raie Emam Suliman** professor of Agricultural Engineering, Agricultural Engineering Department, faculty of Agriculture, Cairo University and **Dr. Yossry Bayoumy Abdelhay** Lecturer of Agricultural Engineering, Agricultural Engineering Department, faculty of Agriculture Cairo University for their encouragement, advice, and guidance through this work. Thanks are also extended to the staff members of department of agricultural engineering, faculty of agriculture.*

*Special thanks are extended to my friends and colleagues. Finally, my thanks and appreciation to my family, for their patience, moral support and encouragement during the study period.*



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