STUDIES ON THE USE OF CERAMIC MEMBRANES IN DAIRY INDUSTRIES

BY

ABEER FOUAD ZAYAN

B.Sc. Agric. (Dairy Science and Technology)
Ain Shams University, (1990)

A thesis submitted in partial fulfilment
of the requirement for the degree of

Master of Science

IN

Agriculture
(Dairy Science and Technology)

Food Science Department
Faculty of Agriculture
Ain Shams University

1997

Approval sheet

STUDIES ON THE USE OF CERAMIC MEMBRANES IN DAIRY INDUSTRIES

BY

ABEER FOUAD ZAYAN
B.Sc. Agric. (Dairy Science and Technology)
Ain Shams University, (1990)

This thesis for the Master degree has been approved by:

PROF. DR. A.A. EL-NASHAWY
Prof. of Dairy Science,
Zagazeg University.

A.A. EL Nashawy

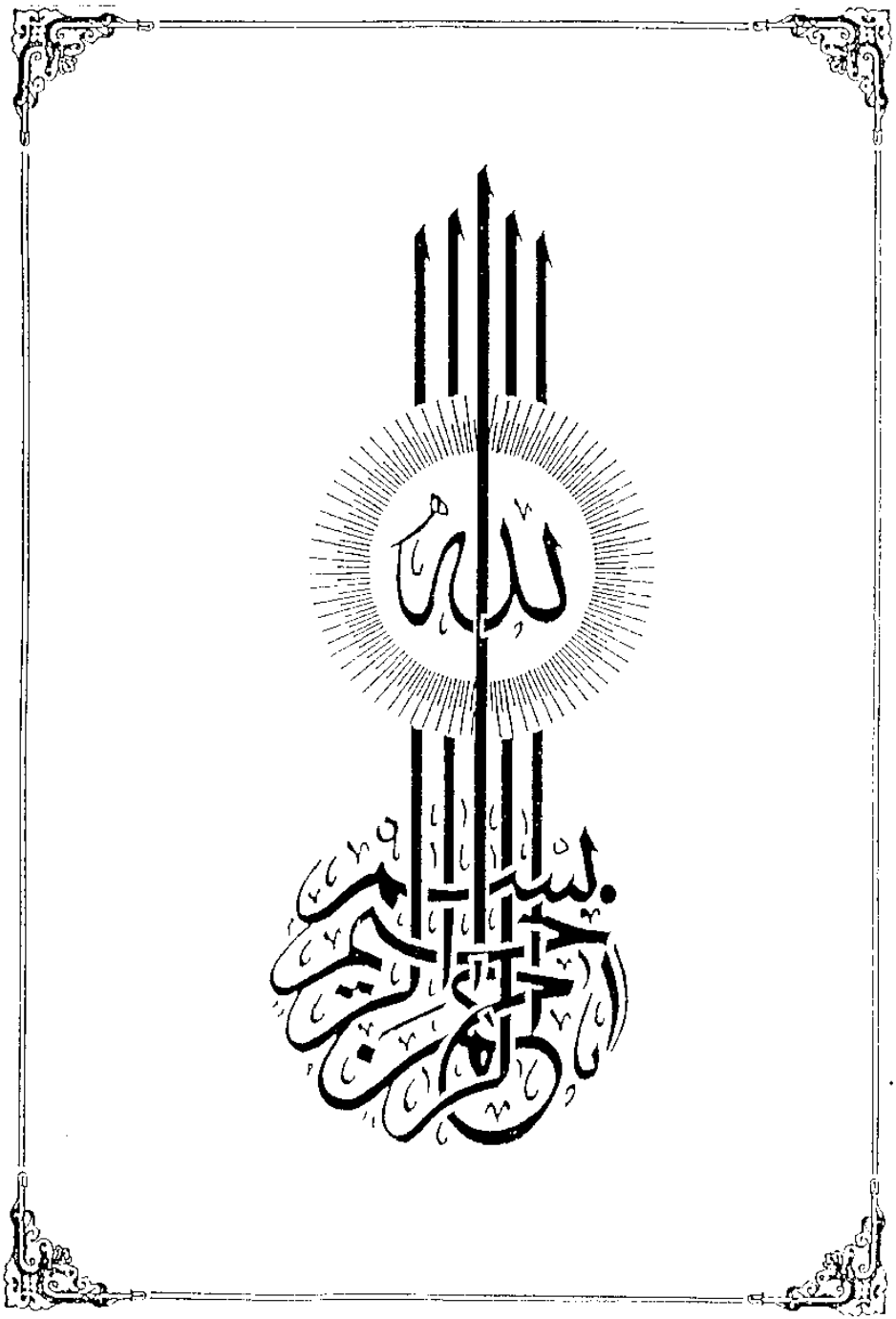
DR. A.M. GAAFER
Associate Prof. of Dairy Science,
Fac. of Agric., Ain Shams Univ.

A. Gaafar

PROF. DR. M. A. HOFI
Prof. of Dairy Science, Fac. of
Agric., Ain Shams University
(Supervisor)

M. Hofi

Date of Examination: 24/ 7/1997.



STUDIES ON THE USE OF CERAMIC MEMBRANES IN DAIRY INDUSTRIES

BY

ABEER FOUAD ZAYAN

B.Sc. Agric. (Dairy Science and Technology)
Ain Shams University, (1990)

Under the supervison of:

PROF. DR. G. A. MAHRAN

Prof. of Dairy Science and Technology
Faculty of Agriculture, Ain Shams University

PROF. DR. M. A. HOFI

Prof. of Dairy Science and Technology
Faculty of Agriculture, Ain Shams University

ABSTRACT

Abeer Fouad Zayan. Studies on the Use of Ceramic Membranes in Dairy Industries. Unpublished Master of Science, Ain Shams University, Faculty of Agriculture, Food Science Department (1997).

In the present study, performance characteristics of ceramic membranes were evaluated. The resultant milk retentate and lactitol as bulk sweetner were used in the manufacture of ice milk. Properties of ice milk mixes and resultant ice milk were studied.

Permeate flux in all runs fell rapidly at the beginning of operation and reached to a steady state after a period of 3 hours. Higher flow rate and flux were associated with the application of higher pressure and higher temperature. Ceramic membrane characterized with its high retention for protein, namely 92%. It retained also 52% of milk solids 100% of fat, 0.0% of lactose and 30.0% of milk ash. Analysis of minerals indicated partial concentration Ca^{++} by 5 fold and 97% retention, K^{++} by 5 fold and 33.2% retention, P^{++} by 5 fold and 90% retention, Mg^{++} by 5 fold and 73% retention, Mn^{++} by 5 fold and 81% retention.

Concentration of buffaloes milk by 5 fold amino acids decreased by a minimum of 0.1% for Isoleucin to maximum of 51% for Glutamine and expressed on retention value by a minimum of 14% for Aspartic acid ceramic membrane retained about 15% of Thiamine, 69% of Glutamine, 22% of Proline, 45% of Glycine, and 15% for Alanine.

Lactitol as bulk sweetner had no effect of mix properties namely specific gravity weight pergallon expect slightly increase

in freezing point of the resultant ice cream using lactitol as a bulk sweetner lead to decrease energy value.

The level of acceptability increased as the proportion of lactitol was increased. Ice milk from 50% lactitol was criticised for its relatively soft body. Therefore, 100% lactitol was the best choice.

Key words: Ceramic membrane, UF parameters, Amino acids, Lactitol, diet ice milk, diabetic ice milk, Menirals.

ACKNOWLEDGEMENT

I would like to express my sincere gratitutde with deep thanks to Prof. ***Dr. G.A. MAHRAN***, Professor of Dairying, and Prof. Dr. ***M.A. HOFI***, Professor of Dairying, Food Science Department, Faculty of Agriculture, Ain Shams University for their supervision and quidance, they kindly offered throughout the period of this study.

Thanks are due to the staff members, speciall Dr. ***Y.A. HEKAL***, Assist. Prof. of Food Industries, as well as colleagues of the Department of Food Science, Ain Shams Univ., for their valuable help and encouragement.

Finally, great thanks should be extended to my mother, husband, dear brother and sisters for their continuous encouragement which made the completion of this work possible.

CONTENTS

LIST OF TABLES