

شبكة المعلومات الجامعية







شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها على هذه الأفلام قد أعدت دون أية تغيرات



يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار في درجة حرارة من ١٥-٥٠ مئوية ورطوبة نسبية من ٢٠-٠٠% To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%



بعض الوثائـــق الإصليــة تالفــة



بالرسالة صفحات لم ترد بالإصل

EOVY

STUDIES ON CURED MEATS AND MEAT PRODUCTS

BY

TAREK MOHAMED MAHMOUD MOHAMED ALI HEGAZI

B.Sc., Agric.(Food Technology), Fac. of Agric., Fayoum, Cairo Univ. 1985 M.Sc. (Food Science), Fac. of Agric., Fayoum, Cairo Univ. 1992

THESIS

Submitted in Partial Fulfillment of the Requirements for the degree of

DOCTOR OF PHILOSOPHY

in

FOOD SCIENCE and TECHNOLOGY

Department of Food Technology Faculty of Agriculture, Fayoum Cairo University

1999

APPROVAL SHEET

NAME: TAREK MOHAMED MAHMOUD MOHAMED ALI

HEGAZI

TITLE: STUDIES ON CURED MEATS AND MEAT PRODUCTS

THESIS

Submitted in Partial Fulfillment of the Requirements for the degree of

DOCTOR OF PHILOSOPHY

IN FOOD TECHNOLOGY

Department of Food Science and Technology Faculty of Agriculture, Fayoum Cairo University 1999

This Thesis has been approved by:

Prof. Dr. Mohamed Abd El-Hafeez Abd El-Salam

Professor of Food Science and Technology, Food Technology Research Institute, Agric. Res. Center.

Prof. Dr. Ahmed Nor El-Dien Elias

Professor of Food Science and Technology, Fac. of Tourism and Hotels, Helwan Univ.

Prof. Dr. Nabil El-Sayed Hafiz

Professor of Food Science and Technology. Fac. of Agric., Fayoum, Cairo University.

Dr. Mohamed Saleh Abd El-Bary

Associate Professor of Food Science and Technology, Fac. of Agric., Fayoum, Cairo University.

Deposited in the Faculty Library

Date: / /1999

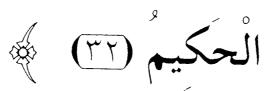
Abd El-Salam, M.A. Y.....

A. Sus Alabil. Hafiz Mohamed Salih

Committee in charge

لِشَمْ النَّهُ الْجَدِينِ الْمُنْ الْعَلَيْلِيلِ الْجَدِينِ الْجَائِينِ الْجَدِينِ الْمَائِلِينِ الْجَدِينِ الْجَدِينِ الْجَدِينِ الْعِلْمِ الْعِينِ الْمِنْ الْعِينِ الْعِلْمِينِ الْعِلْمِ الْعِلْمِينِ الْعِلْمِ الْعِينِ الْعِلْمِ الْعِلْمِ الْعِلْمِ الْعِلْمِ الْعِلْمِ الْعِلِي الْعِلْمِ الْعِيلِي الْعِيلِي الْعِلْمِ الْعِلْمِ الْعِلْمِينِ الْعِلْمِ الْعِلْمِ الْعِلْمِ الْعِلْمِ الْعِلْمِ الْعِلْمِ الْعِلْمِ الْعِلْمِ الْعِلْمِ الْعِيلِي الْعِيلِي الْعِلْمِ الْعِلْمِ الْعِلْمِ الْعِلْمِ الْعِلْمِ الْعِيلِ الْعِيلِي الْعِيلِي الْعِيلِي الْعِيلِي الْعِلْمِ الْعِيلِي الْعِلْمِ الْعِلْمِ ال

هَالُوا سُبْحَانَكَ لا علم لَنَا اللهُ عَلْم لَنَا عَلَم لَنَا اللهَ عَلَم لَنَا اللهَ عَلَم اللهُ ال



صدق الله العظيم سورة البقرة آية ٣٢

THIS WORK IS DEDICATED TO MY PARENTS, MY WIFE, MY KIDS (MOHAMED, SARAH AND HAGER)

ABSTRACT

Smoke liquid was prepared by combustion of Mousky powder and/or flakes sawdust in two forms at different three temperatures, i.e. 250, 350 and 450°C. The sawdust was conditioned to three moisture levels being; 10, 20 and 30 per cent. The obtained results revealed that optimum liquid smoke might be generated by combustion of 20 per cent moisture flakes sawdust at 350°C.

Bastrami samples were processed from beef *Biceps femoris* (B.F.) muscles in two forms, i.e., unsmoked and smoked ones. Smoking of bastrami was performed by injection of smoke liquid after curing. The smoked and unsmoked bastrami samples were stored at room temperature for 4 weeks and analyzed periodically each 2 weeks. Smoked bastrami was highly accepted by panelists and showed a high resistance against the biochemical changes and microbial deterioration.

Longissimus dorsi (L.D.) beef cuts and hind quarters of sheep meat were separately dry cured, boiled and smoked by two ways, i.e., cold and/or spray smoking. The cured boiled smoked meat samples were then stored at 4°C for 4 weeks and periodically analyzed every 2 weeks. The high fat sheep was recommended to be ideal meat for smoking. Liquid smoking was the best technique in which was suggested for meat smoking.

ACKNOWLEDGEMENT

First of all, ultimate thanks are due to Allah, who without his aid this work could not be done.

I wish to express my gratitude to professor Dr. Nabil E. Hafiz, Professor of Food Science and Technology, Faculty of Agriculture, Fayoum, Cairo University for his supervision and guidance and constructive criticism during writing this thesis. I am greatly indebted to Dr. Mohamed S. Abd El-Bary, Associate Professor of Food Science and Technology, Faculty of Agriculture, Fayoum, Cairo University for his valuable helpful during this study.

Many deep thanks are due to Professor Dr. Mohamed S.A. El-Dashlouty, Dean of Faculty of Home Economics, Menoufia University, Prior and Professor of Food Science and Technology for his help and continuous supervision during this work.

Many thanks are also due to all members of Food Science and Technology Department, Fac. Agric., Fayoum, Cairo University for their kind help offered to me in this work.

ABBREVIATION

A.N. Amino nitrogen

A.S. Amino acid scores

B.V Biological value

E.V. Energy value

EAAI Essential amino acid index

GDR Grams daily requirements

NO₂. NO₃ Nitrite and nitrate

O.D. Optical density

PER Protein efficiency ratio

R.A. Restricting amino acid

SS Salmonilla and Shigalla

T.N. Total nitrogen

T.S.N. Total soluble nitrogen

TBA Thiobarbaturic acid

TBC Total bacterial count

WHC Water holding capacity

Y&F Yeast and fungi

CONTENTS

	Page
I. INTRODUCTION	1
II. AIM OF INVESTIGATION	3
II. REVIEW OF LITERATURE	4
2.1. Smoke production	4
2.1.1. Composition of smoke	
2.1.2. Factors affecting the composition and properties of smoke	
2.1.2.1. Effect of wood source	
2.1.2.2. Effect of moisture content:	
2.1.2.3. Effect of air flow	
2.1.2.4. Effect of generating temperature and particles size of sawdust	7
2.2. Smoking methods	8
2.2.1. Traditional smoking	9
3.2.2. Electrostatic smoking	10
2.2.3. Liquid smoke	10
3.2.3.1. Liquid smoke production	11
2.2.3.2. Composition and properties of liquid smoke:	13
2.2.3.3. Function of liquid smoke:	
2.2.3.4. Application of liquid smoke	17
2.3. Meat quality as affected by curing ingredients	17
2.3.1. Curing ingredients	17
2.3.2. Effect of cure ingredients on the meat cuts	
2.3.2.1. The role of curing salts on proteolytic changes	19
2.3.2.2. The role of nitrite on color and flavor of cured meat:	20
2.3.3. Characteristics of meat as affected by smoking	21
2.3.3.1. Physio-chemical and nutritional evaluation:	21
2.3.3.2. Palatability attributes	
2.3.4. Carcinogenic effect of curing and smoking:	
2.3.5. Effect of curing and smoking on the microbial counts and shelf-life:	
III. MATERIALS AND METHODS	
3.1. Materials	
3.1.1. Meat samples	
3.1.2. Sawdust	37
3.1.3. Meat coat	37
3.2. Methods	37
3.2.1. Technical methods	37
3.2.1.1. Liquid smoke preparation	
3.2.1.2. Meat curing	38
3.2.1.3. Processing of bastrami	
3.2.1.4. Processing of boiled smoked meat	
3.2.2. Analytical methods	
3.2.2.1. Gross chemical composition	
3.2.2.2. Determination of energy value	
3. 2.2.3. Total soluble nitrogen (T.S.N.):	
3.2.2.4. Total volatile nitrogen (T.V.N.)	
3.2.2.5. Amino nitrogen (A.N.)	
3.2.2.6. Thiobarbituric acid value (T.B.A.)	
3.2.2.7. Sodium chloride	
3.2.2.9. Nitrosamines	
3.2.2.10. Carbonyl compounds	
3.2.2.11. Phenol compounds	
4	