



شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم



شبكة المعلومات الجامعية
@ ASUNET



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
علي هذه الأفلام قد أعدت دون أية تغيرات



يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of
15-25- c and relative humidity 20-40%

بعض الوثائق الأصلية تالفة

بالرسالة صفحات لم ترد بالاصل

Cairo Univeristy
Faculty of Veterinary Medicine
Department of Virology

رئيس لجنة
المشرف على الرسالة

د. محمد سامي صابر

Studies on inactivated oil FMD vaccine

THESIS PRESENTED

BY

OSAMA HUSSEIN ROCHDY AHMED MOHAMED

B.V.Sc. 1984 - Cairo University

M.V.Sc. 1992 - Cairo University

FOR

Ph. D. Vet. Degree

(Virology)

Under supervision of

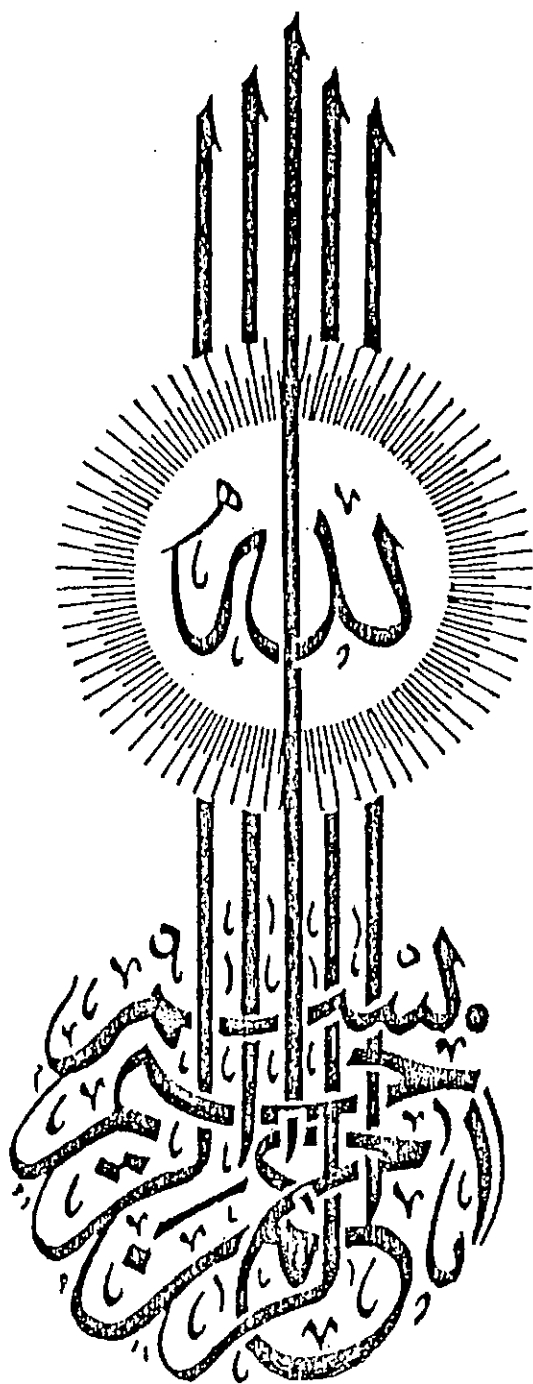
Prof.Dr. MOHAMED SAMI SABER

Prof of Virology
Chairman of Virology Department
Faculty of Veterinary Medicine
Cairo University

Dr. ADEL OMAR ABD EL RAHMAN

senior Researcher and Head of FMD Dept.
Vet Serum & Vaccine Research Institute , Abbassia
Cairo , EGYPT.

(1996)



قَالُوا سُبْحَانَكَ لَا إِلَهَ إِلَّا مَا
عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ
سُورَةُ الْبَقَرَةِ - آيَةُ ٢٢

**CAIRO UNIVERSITY
FACULTY OF VETERINARY MEDICINE
DEPARTMENT OF VIROLOGY**

APPROVAL SHEET

(studies on inactivated oil FMD vaccine)

BY

OSAMA HUSSEIN ROCHDY AHMED MOHAMED

APPROVED BY:

PROF. DR. AHMED MAHMOUD DAOUD *Ahmed Daoud*
VET. SERUM, VACCINES RESEARCH INSTITUTE

PROF. DR. MOHAMED ABED - EL HAMID
SHALABY *Shalaby*
PROF. OF VIROLOGY
FACULTY OF VETERINARY MEDICINE
CAIRO UNIVERSITY

PROF. DR. MOHAMED SAMI SABER *M. Sami Saber*
PROF. OF VIROLOGY, HEAD OF VIROLOGY DEPT
CAIRO UNIVERSITY (SUPERVISOR)

DATE 13/6/1996

ACKNOWLEDGMENT

In actual fact, that prayerful thanks at first to our merciful ALLAH, who give me everything I have.

I am greatly indebted to Dr. M.S. Saber, prof. Dr. of virology , faculty of veterinary Medicine, Cairo university, who supervised and planned this work for his continuous encouragement .

Without his advice, this work would have lost its value .

I give sincere to acknowleadge Dr. Adel Omer Abd El Rahman, cheif researcher, FMD Department, veterinary serum and vaccine Research Institute, for his close supervision , kind help for offering me much of his precious time and effort .

Also Dr.Ahmed Daoud Director of veterinary serum and vaccine Research Institule, for giving me the chance and facilities to carry out this work during the whole length of the thesis .

Deep appreciation is also expressed to Dr. Sinan EL-Nakashiy, senior researcher, FMD Department, veterinary serum and vaccine Research

Institute, and Dr.momtaz Mahmoud Wasfy, Researcher at NAMRU-3, for their great help and effort during the practical work .

Finally, to all my staff members, specially, Dr. Samira EL-Kilany and Dr. Hossam Gamal El-Din, FMD department veterinary serum and vaccine Research Institute .

I'm realy feel thankfull and record my gratefull acknowledgment to my Family especialy my mother for her support me .

CONTENTS

	Page
1. Introduction	1
2. Review of literature	5
2.1 Foot and Mouth Disease in Egypt	5
2.2 Foot and Mouth disease virus (FMDV)	6
2.2.1 Classification of FMD virus	6
2.2.2 Morphology of FMD virion	7
2.2.3 Chemical composition of FMD virus	
2.2.4 Types and subtypes of FMD virus	9
2.2.5 Antigenic components of FMD virus	10
2.2.5.1 Structural antigens	10
2.2.5.2 Non- Structural antigens	12
2.2.5.2.1 Virus Infection Associated antigen	12
2.2.6 Physico-chemical properties of FMD virus	12
2.2.6.1 Effect of pH	12
2.2.6.2 Effect of heat	14
2.2.6.3 Effect of ultraviolet rays	15
2.2.6.4 Effect of dicationic salts	15
2.3 Immunity following vaccination	16
2.4 Foot and Mouth Disease vaccines	25
2.4.1 Types of inactivated FMD vaccines according to the adjuvants	25
2.4.1.1 Aluminium hydroxide gel vaccine	25
2.4.1.2 Saponin vaccines	27

	Page
2.4.1.3 Oil vaccines	28
2.5 Epizootiology of the foot and mouth FMD disease ..	30
2.6 Control of foot and Mouth Disease	32
3 MATERIAL AND METHODE	34
3.1 Materials	34
3.1.1 Animals	34
3.1.1.1 Cattle	34
3.1.2 Laboratory animals	34
3.1.2.1 Unweaned baby mice	34
3.1.2.2 Guinea pigs	34
3.1.3 Samples	35
3.1.3.1 Blood Samples	35
3.1.4 Virus	35
3.1.4.1 FMD virus antigen strain .O ₁ / 2/ 72 Egypt	35
3.1.5 Tissue Cultures	35
3.1.5.1 Primary monolayer cultures	35
3.1.5.2 Baby Hamster Kidney Cells (BHK21 clone 13)	36
3.1.6 Biological Reagents	36
3.1.6.1 Antisera	36
3.1.6.2 Bovine Serum for cell cultures	36
3.1.6.3 Complement	36
3.1.6.4 Haemolysin (Amboceptor)	37
3.1.6.5 Sheep Erythrocytes	37
3.1.6.6 Antibiotics	37

3.1.7	Chemical Reagents	37
3.1.7.1	Growth Medium	37
3.1.7.2	Maintenance Medium	38
3.1.7.3	Sodium bicarbonate Solution	38
3.1.7.4	Trypsin Solution	38
3.1.7.5	Merthiolate	38
3.1.7.6	Tween 20	38
3.1.7.7	Chloroform (Analar)	38
3.1.7.8	Phenol red	39
3.1.7.9	Phosphate Buffer Saline	39
3.1.7.10	Crystal violet stain	39
3.1.7.11	Saponin	40
3.1.7.12	Quil A	40
3.1.7.13	Alhydrogel	40
3.1.7.14	Aluminium hydroxide gel	40
3.1.7.16	Marcol 52	40
3.1.7.17	Span 80	40
3.1.7.18	Tween 80	40
3.1.7.19	2-bromoethylene Amine hydrobromide (BEA)	41
3.1.7.20	Sodium hydroxide	41
3.1.7.21	Sodium thiosulphate	41
3.1.7.22	Modified Alsever's soluion	41
3.1.7.23	Veronal Buffer	41
3.1.8	ELISA Reagent	42

3.1.8.1	Coating Buffer	42
3.1.8.2	Phosphate Buffer Saline (PBS) and Bovine Albumin	
3.1.8.3	Washing Buffer	42
3.1.8.4	Substrate phosphate Citrate Buffer	43
3.1.8.5	Conjugate	43
3.1.8.5.1	Antiguinea pig horse reddish peroxidase conjugate ..	43
3.1.8.6	Positive control serum	43
3.1.8.7	Negative control serum	44
3.1.8.8	Substrate	44
3.1.8.9	Stopping Solution	44
3.1.8.10	Elisa plates	44
3.2	Methods	45
3.2.1	Virus titration	45
3.2.1.1	In tissue culture	45
3.2.1.2	In mice	45
3.2.2	Antigenicity titration	45
3.2.2.1	Complement fixation test (CFT)	45
3.2.2.2	Complement titration	46
3.2.3	Preparation of vaccines	46
3.2.3.1	Production of 30 % Alhydrogel (FMD) vaccine	46
3.2.3.2	Production of Double oil emulsion (FMD) vaccine (with span 80 as a new emulsifier).....	47
3.2.3.3	Production of Double oil emulsion FMD vaccine (with Arlacel A as classic emulsifier)	48

3.2.3.4	Production of quail A FMD vaccine	49
3.2.4	Vaccine testing	49
3.2.4.1	Sterility test (purity test)	49
3.2.4.2	Safety	49
3.2.4.3.	Patency test of FMD vaccine in cattle :	49
3.2.4.4.	Evaluation of the results	49
3.2.5.	Serological tests	49
3.2.5.1.	Serum Neutralization Test (SNT)	49
3.2.5.2.	Enzyme Linked Immunosorbant Assay (ELISA)	50
3.2.5.2.1.	The Liquid phase blocking sandwich ELISA	51
4.	EXPERIMENTS AND RESULTS	52
	Experiments No. 1.....	52
	Experiments No. 2.....	53
	Experiments No. 3.....	61
	Experiments No. 4.....	65
	Experiments No. 5.....	71
	Experiments No. 6.	76
	Experiments No. 7.....	81
	Experiments No. 8.....	87
5-	Discussion	93
6-	Conclusion	105
7-	Summary	107
8-	References	108
9-	Arabic Summary	