IMMUNOLOGICAL STUDIES ON VACCINATION OF CATTLE WITH STRAIN RB51 AND STRAIN 19

A Thesis presented

by

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B. V. Sc. Alexandria University, 1994

M. V. Sc. Alexandria University, 2000

For

The degree of Ph.D. in Veterinary Science

(Microbiology)

To

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Alexandria University

(2005)

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Acknowledgements

First of all my prayerful gratitude should be submitted to the merciful **ALLAH** whose help I always seek, and without his willing, I will achieve nothing.

I am sincerely grateful to Prof. Dr. **Helmy Ahmed Torky**, Professor of Microbiology, Faculty Veterinary Medicine, Alexandria University, for his supervision, scientific guidance, valuable advices and continuous encouragement throughout the study.

I would like to express my sincere gratitude to Prof. Dr. **Mohamed Hossam El-Din Refai Kottb**, Head of Reproductive diseases Research Department, Animal Reproduction Research Institute (ARRI) for his kind supervision, valuable advices, and unlimited help.

I'm also grateful to Prof.Dr. **Ibrahim Gad A. Ibrahim**, Head of Research, Reproductive diseases Research Department, ARRI, for his helpful advice and encouragement.

My deep cordial thanks **Dr.Mohamed Abdel Maksoud** Naval Medical Research Unit (NAMRU3) for his valuable help in the practice of PCR.

Finally, my greatest appreciation to all staff members of Microbiology Dept., Faculty Veterinary Medicine, Alexandria University and Reproductive diseases Research Dep., ARRI for their kind encouragement.

List of abbreviations

Anti A	*Monospecific Antisera Brucella abortus*
Anti M	*Monospecific Antisera Brucella melitensis*
B. abortus	*Brucella abortus*
B. melitensis	*Brucella melitensis*
bp	*Base Pair*
BSA	*Bovine Serum Albumin*
CFU	*Colony Forming Unit*
DNase	*Deoxyribonuclease*
EDTA	*Ethyelene-Diamine-Tetra acetic Acid*
ELISA	*Enzyme Linked Immunosorbant Assay*
Mol. W.	*Molecular Weight*
MRT	*Milk Ring Test*
O.D.	*Optical Density*
PBS	*Phosphate Buffer Saline*
PBST	*Phosphate Buffer Saline + Tween 80*
RBPT	*Rose Bengal Plate Test*
RT	*Rivanol Test*
S 19	*Brucella abortus strain 19*
S/B	*Spleen weigh / Body weight*
SAT	*Standard Tube Agglutination Test*
RB51	*Brucella abortus strain RB51*
TBS	*Tris + Buffer Saline*

TBST *TBS + Tween*

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Introduction

Animal Brucellosis is a disease affecting various domestic and wild life species. Six species of Brucella exist which are associated with several principle host; *B. abortus* (cattle), *B. melitensis* (goat), *B. canis* (dogs), *B. suis* (swine), *B. ovis* (sheep) and *B. neotomae* (desert rats)(Stoenner and Lackman 1957). Recently, Brucella infected sea mammals **(Ross, 1996).**

Several Brucella species can infect human causing a zoonotic disease called 'undulant fever' that associated with headache, night sweet, arthritis and bone deformities **(Young, 1983).** 500,000 people were found to be infected every year **(OIE 2001).** Human brucellosis is a worldwide public health concern especially in undeveloped countries where brucellosis in cattle continuos to be a wide spread zoonotic problem **(Matyes and Fujikura, 1984).**

Bovine brucellosis is an economically important abortifacient disease in cattle caused mainly by *B. abortus* **(Winkler, 1982).** Vaccination of female calves wit *B. abortus* strain 19 (S 19) has been used worldwide to prevent the disease in cattle. S 19 is live, attenuated vaccines which result in variable levels of protection, depending on incidence of the disease **(Nicoletti, 1990).** In some countries, S 19 has been used to vaccinate adult cattle to increase the immunity in herds with high risk of brucellosis **(Nicoletti, 1990)**.

It is interest that S 19 vaccinations, cattle naturally infected with B. abortus field strains develop antibodies against the O-chain surface antigen of the lipopolysaccharide (LPS) and this is used to diagnose the disease **(Diaz et al., 1968).**

S 19 calfhood vaccination induces antibodies of similar specificity; these antibodies vanish quickly in most animals but can persist in some cases **(Nicoletti, 1990).** Revaccination gives better immunity, but the problem of seroconversion following revaccination adult with S 19 outweighed the benefits **(McDiarmid, 1957).** A major objective in research on bovine brucellosis is development of live vaccine that will induce protection against infection and abortion. In addition, the new vaccine should induce antibody responses that can be differentiated from responses induced by virulent field strains of Brucella in the standard serological tests now used for the presence of antibodies. Testing of modified strains of *B. abortus* for use in vaccines requires time-consuming and expensive challenge experiments in pregnant cattle. Protection, measured as reduced placental infection and abortion, is difficult to demonstrate, and acceptable quantitation requires large number of cows **(Deyoe, 1980).**

Recently, Schurig and his coworkers produce a stable rough variant of *B. abortus 2308* that was designated RB51 **(Schurig et al., 1991).**

Strain RB51 had diminished virulence in comparison with strain 2308 and S 19 **(Samartino and Enright, 1992)** and did not induce the formation LPS-specific antibodies **(Schurig et al., 1994 and Cheville et al., 1992).** These phenomena suggest that SRB51 might be better than S 19 as a vaccine in cattle because RB51 induces immunity without inducing serologic response to LPS that are detected by diagnostic tests for brucellosis. Therefore, the RB51 vaccine may enable more efficient serological identification and removal of cattle with brucellosis from the vaccinated herds. The stability and vaccine efficacy of *B. abortus* RB51