



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

A Thesis presented

by

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List of abbreviations

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

List of contents

Subject	Page number
<i>1-Introduction</i>	<i>1</i>
<i>2-Review of literature</i>	<i>4</i>
2-1- Historical overview of Brucellosis	6
2-2-General Characteristics	7
2-3-The incidence of Brucellosis in Egypt	15
2-4-Characteristics of ideal Vaccine for prevention of Brucella infection	17
2-5- Brucella abortus strain 19 (S19)	19
2-5- Brucella abortus strain RB51	21
2-6-Immune response to strain 19 Vaccine	22
2-7- Immune response to strain RB51 vaccine	24
2-8-Comparative studies between RB51 and S-19 vaccin (Safety and immune response)	30
2-9- Serological diagnosis of brucellosis	38
2-10- Guinea pigs as experimental animal for Brucellosis	41
2-11-Polymerase Chain Reaction (PCR)	
<i>3-Mtrial and methods</i>	<i>51</i>
<i>3-1- Martial</i>	<i>51</i>
3-1-1- animals	52
3-1-2-Experimental animals	53
3-1-3-Brucella vaccines	53
3-1-4-Brucella antigens	54

<i>3-1-5-Monospecific antisera</i>	54
<i>3-1-6-Culture media</i>	54
<i>3-1-7-Chemicals and reagents</i>	56
<i>3-1-8-Inhibitors for selective media</i>	56
<i>3-1-9- Dyes for sensitivity test media</i>	57
<i>3-1-10-Diluents and buffers</i>	57
<i>3-1-11-Stains</i>	57
<i>3-1-12Requirements for Dot-ELISA</i>	
<i>3-1-13- Apparatuses</i>	59
<i>3-1-14- Reagents used for DNA extraction</i>	59
<i>3-1-15- Reagents and equipments used for Polymerase Chain Reaction (PCR)</i>	61
<i>3-1-16- Chemicals and equipment used for electrophoresis</i>	63
 5-Methods	65
<i>3-2-1- Collection of samples</i>	65
<i>3-2-2- Serological tests</i>	66
<i>3-2-2-1-RoseBengal test</i>	66
<i>3-2-2-2Standard tube agglutination test (SAT)</i>	68
<i>3-2-2-3-Revional test (RT)</i>	69
<i>3-2-2-4-EDTA modified SAT</i>	70
<i>3-2-2-5-Milkringtest (MRT)</i>	71
<i>3-2-3- Isolation and identification of Brucella microorganism by culture of specimen</i>	71
<i>3-2-4-Colony blot (Dott blot ELISA) using enzyme linked immuno -sorbant method</i>	76
<i>3-2-5- Challenge test</i>	78
<i>3-2-6- Molecular Biology (PCR)</i>	79
<i>3-2-6-1Preparation of genomicDNA from Brucella</i>	79
<i>3-2-6-2- DNA amplification by PCR</i>	81
<i>3-2-6-3- RAPD by PCR6-2-6-3- Identification of PCR product</i>	81
 4- Result	82
<i>4-1- Results of field study</i>	83
<i>4-2- Serological examination</i>	83

<i>4-2-1- Results of infected non vaccinated herds</i>	85
<i>4-2-1-1- Results of recently- brucella infected non vaccinated herds</i>	85
<i>4-2-1-2- Results of chronically - brucellosis infected non vaccinated herds</i>	87
<i>4-2-2- Results of vaccinated herds with S 19</i>	89
<i>4-2-2-1-Results of non-infected vaccinated herds with S19</i>	89
<i>4-2-2-2-Results of infected herds vaccinated with S 19</i>	91
<i>4-2-3- Results of herds vaccinated with RB51</i>	93
<i>4-2-3-1- Results of non-infected herds vaccinated with RB51</i>	93
<i>4-2-3-2- Results of infected herds vaccinated with RB51</i>	95
<i>4-2-4- Results of infected cattle herds that calf-hood was vaccinated with S 19 then adult was re-vaccinated with RB51</i>	97
4-3 Bacterological Examination	104
<i>4-4- Results of Challenge tests</i>	105
<i>Evaluation of Vaccination with RB51 & S 19 in Guinea pigs</i>	
<i>4-4-1- Results of group (1) Guinea pigs vaccinated with RB51 (Not challenged)</i>	105
<i>4-4-2- Results of group (2) Guinea pigs not, and infected with B. melitensis biovar 3 field strain</i>	107
<i>4-4-2- Results of group (2) Guinea pigs vaccinated with S.19, and challenged with B. abortus field strain</i>	109
<i>4-4-4- Results of group (4) Guinea pigs vaccinated with S.19 and challenged by B. melitensis field strain</i>	111
<i>4-4-5- Results of group (5) Guinea pigs, vaccinated with RB51 and challenged with B. abortus field strain</i>	113
<i>4-4-6- Results of group (6) Guinea pigs vaccinated with RB51 and challenged with B. melitensis</i>	115

<i>(local field strain)</i>	
<i>4-4-7- Results of group (7) Guinea pigs vaccinated with first full dose of RB51 , then re-vaccinated 6 weeks later with reduced dose RB51 (booster dose) then challenged with B. melitensis field strain</i>	<i>117</i>
<i>4-4-8 Results of group (8) Guinea pigs vaccinated with S.19, then re-vaccinated with RB51 and challenged with B. melitensis field strain</i>	<i>119</i>
<i>4-4-9- Results of group (9) Guinea pigs vaccinated with RB51, then re-vaccinated S.19 (booster dose) then challenged with B. melitensis (field strain)</i>	<i>121</i>
<i>4-5-Results of PCR</i>	<i>123</i>
<i>4-5-1- Results of RAPD PCR</i>	<i>123</i>
<i>4-5-2 Results of AMOS PCR.</i>	<i>125</i>
	<i>138</i>
<i>5-Discussion</i>	
<i>6-Summary</i>	<i>149</i>
<i>7-References</i>	<i>153</i>
<i>8-Arabic Summary</i>	<i>194</i>

List of Tables

Table	Page number
<i>Tested cattle herds.</i>	51
<i>Sequence of oligonucleotide primers used for RAPD amplification</i>	62
<i>Sequence of oligonucleotide primers for AMOS-PCR</i>	62
<i>Conversion of B. abortus Serum Agglutination Test to International unit (IU/ml) [Hendery et al. 1985].</i>	67
<i>Interpretation of SAT reaction</i>	69
<i>Differentiation and characteristics of species of the genus Brucella and their biotypes</i>	75
<i>Characteristics distinguishing live vaccine B.abortus S</i>	76
<i>groups of guinea pigs in challenge test</i>	78
<i>19 from B.abortus biovar 1 strains</i>	
<i>Classification of farms with regard to history of brucellosis & vaccination status .</i>	84
<i>Results of recently infected non vaccinated herds:</i>	86
<i>Results of Chronically infected non-vaccinated</i>	88

<i>herds</i>	90
<i>Results of Non-infected herds vaccinated with S 19</i>	92
<i>Results of Infected herds vaccinated with S 19</i>	94
<i>Results of Non-infected herds vaccinated with RB51</i>	96
<i>Results of Infected herds vaccinated with RB51</i>	98
<i>Results of Infected herd that Calf-hood vaccinated with S-19 then adult vaccinated with RB51</i>	99
<i>Comparison between different herds.</i>	104
<i>Bacterological Examination of Aborted faeti & milk samples</i>	106
<i>Results of Group (1) Guinea pigs vaccinated with RB51.(No Challenge)</i>	108
<i>Results of Group (2) Guinea pigs non-vaccinated and infected by B. melitensis biovar 3 (Field strain).</i>	110
<i>Results of Group (3) Guinea pigs vaccinated with S-19 and challenged by B. abortus biovar 1 (Field strain).</i>	112
<i>Results of Group (4) Guinea pigs vaccinated with S 19 and challenged by B. melitensis biovar 3 (Field strain).</i>	114
<i>Results of Group (5) Guinea pigs vaccinated with RB51 and challenged by B. abortus biovar 1 (Field strain).</i>	116

<i>Results of Group (6) Guinea pigs vaccinated with RB51 and challenged by B. melitensis biovar 3 (Field strain).</i>	<i>118</i>
<i>Results of Group (7) Guinea pigs vaccinated with full dose of RB51 then boosted with reduced dose of RB51, then challenged</i>	<i>120</i>
<i>Results of Group (8) Guinea pigs vaccinated with S-19 and boosted with RB51, then challenged with B. melitensis biovar 3</i>	<i>122</i>
<i>Results of Group (9) Guinea pigs vaccinated with RB51, booster vaccination with S 19 , 6 weeks interval, then challenged 8 weeks after the booster dose with B. melitensis biovar 3</i>	<i>124</i>
<i>Results of RAPD PCR</i>	<i>130</i>
<i>Result of AMOS PCR</i>	

List of Figures

Figure	Page number
<i>Comparison between results of RBPT of different herds</i>	100
<i>Comparison between results of SAT of different herds.</i>	101
<i>Comparison between results of Milk Ring Test of different herds.</i>	102
<i>Comparison between numbers of aborted feoti in different herds</i>	103
<i>Result of RAPD PCR test Brucella Vaccines S 19 & RB 51 using Mix. of set primers.</i>	124
<i>Results of AMOS- PCR1</i>	
<i>Results of AMOS- PCR2</i>	126
<i>The identification of each Lane band concerning the RAPD amplification</i>	127
<i>Electerophoretic pattern of RAPD PCR test Brucella Vaccines S 19 & RB 51 using Mix. of set primers.</i>	128
<i>Electrophoretic pattern of Hae III Marker.</i>	128
<i>Electrophoretic pattern of S 19 in RAPD I.</i>	129
<i>Electrophoretic pattern of RB 51 in RAPD I.</i>	129
<i>Electrophoretic pattern of S 19 in RAPD II.</i>	129
<i>Electrophoretic pattern of RB 51 in RAPD II.</i>	130
<i>Electrophoretic pattern of S 19 in RAPD III.</i>	130
<i>Electrophoretic pattern of RB 51 in RAPD III.</i>	130

<i>The identification of each lane band concerning the AMOS PCR amplification.</i>	131
<i>Results of AMOS- PCR</i>	131
<i>Electrophoretic pattern of PCR test of Brucella strains using Mix. Of set primers</i>	132
<i>Electrophoretic pattern of PCR of molecular weight DNA marker</i>	132
<i>Electrophoretic pattern of PCR of Brucella abortus(reference strain)</i>	132
<i>Electrophoretic pattern of PCR of Brucella melitensis(reference strain)</i>	132
<i>Electrophoretic pattern of PCR of Brucella suis (reference strain)</i>	133
<i>Electrophoretic pattern of PCR of local isolate of Brucella melitensis</i>	133
<i>Electrophoretic pattern of PCR of local isolate of Brucella melitensis</i>	134
<i>Electrophoretic pattern of PCR of local isolate of Brucella melitensis</i>	134
<i>Electrophoretic pattern of PCR of local isolate of Brucella melitensis</i>	134
<i>Electrophoretic pattern of PCR of local isolate of Brucella melitensis</i>	135
<i>Electrophoretic pattern of PCR of Strain 19</i>	135
<i>Electrophoretic pattern of PCR of RB 51</i>	135
<i>Brucella abortus strain RB 51 stained with modified Z. N. stain.</i>	136
<i>Brucella abortus strain 19 stained with modified Z. N. stain.</i>	136
<i>Milk ring test (MRT)</i>	137
<i>Macroscopical changes of guinea pig spleen.</i>	137
<i>Dott blot ELISA of brucella culture plate</i>	138

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 calfood 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