

List of Abbreviations

Ab (s)	Antibody / Antibodies
ACTH	Adrenocorticotrophin Hormone
APC	Antigen Presenting Cell
B.	<i>Bacillus / Bacilli</i>
Bb.	<i>Bifidobacteria</i>
BPB	Bromo Phenol Blue
BSA	Bovine Serum Albumin
Bwt	Body Weight
C domain	Constant domain
CD4+	CD4+ T helper cell
CD8+	CD8+ T helper cell
CFa	Complete Freund's adjuvant
CFM	Concentrate Feed Mixture
CFU	Cell Forming Unit
CH domain	Constant domain of Heavy chain
CL domain	Constant domain of Light chain
CRH	Corticotrophin- Releasing Hormone
DC	Dendritic Cell
DFM	Direct- Fed Microbial
<i>E. coli</i>	<i>Escherchia coli</i>
EFSA	European Food Safety Authority
ELISA	Enzyme Linked Immuno-Sorbent Assay
EU	European Union
FAO	Food and Agriculture Organization
FDA	Food and Drug Administration
G	Group
GALT	Gut - Associated Lymphoid Tissue
GIT	Gastro-Intestinal Tract
GRAS	Generally Recognized As Safe
H- chain	Heavy chain
HCAb	Heavy Chain Antibody
HRP	Horseradish Peroxidase
IFa	Incomplete Freund's adjuvant

IFN-γ	Interferon-gamma
Ig (s)	Immunoglobulin (s)
IL (s)	Interleukin (s)
kDa	Kilo Dalton
L- chain	Light chain
L.	<i>Lactobacillus</i>
LAB	Lactic Acid Bacteria
LDL	Low Density Lipoprotein
M - cell	Mast cells
MAMP	Microbial- Associated Molecule Pattern
MLN	Mesentric Lymph Node
mM	milli- Molar
MOS (s)	Mannan Oligosaccharide (s)
Mwt	Molecular weight
ng	1 nanogram (= 0.001 microgram)
Nb (s)	Nanobody/ Nanobodies
NK cell	Natural Killer cell
OD	Optical Density
pAb	Polyclonal Antibody
PAMP	Pathogen-associated molecular pattern
PBS	Phosphate Buffered Saline
pg	1 picograms (= 0.001 nanogram)
PP	Peyer's Patch
PRR	Pattern Recognition Receptor
SAS solution	Saturated Ammonium Sulfate solution
SC	<i>Saccharomyces cerevisiae</i>
SDS-PAGE	Sodium Dodecyl Sulfate Polyacrylamide Gel Electrophoresis
SE	Standard Error
sp.	Species
T- reg cell	T regulatory cell
TEMED	Tetra Methethelene Diamine
TGF-β	Transforming Growth Factor- beta
Th1 cell	T- helper 1 cell
Th2 cell	T- helper 2 cell
TLR	Toll- like Receptor

TNF	Tumor Necrosis Factor
UV	Ultra Violet
V domain	Variable domain
VH domain	Variable domain of Heavy chain
VHH	Variable domain of heavy chain of HCAb
VL domain	Variable domain of Light chain
WBC(s)	White Blood Cell(s)
WHO	World Health Organization
α, β, γ	Alfa , Beta , Gamma
β- Glucan	Beta Glucan
μl	1 microliter (= 0.001 milliliter)
+ ve/ -ve	Positive/ Negative
+1m	One month post-calving
+1w	One month post-calving
-1m	One month pre-calving
-2m	Two months pre-calving

List of Figures

		Page
Figure 1	Arabian, or Dromedary she-camel and calf (<i>Camelus dromedarius</i>).	6
Figure 2	Global distribution of camel population heads worldwide according to FAO statistics, 2014.	7
Figure 3	Number of camel heads in Africa according to FAO statistics between 2004 – 2014.	8
Figure 4	Number of camel heads in Egypt according to FAO statistics between 2004– 2014.	8
Figure 5	Gross anatomy of Camel's Thymus.	10
Figure 6	Gross anatomy of Camel's Spleen.	11
Figure 7	Sub-mandibular Lymph Node of a mature Dromedary Camel. A. Outer view & B. Section view showing lobulation.	13
Figure 8	Distribution of the externally palpable lymph nodes in dromedary Camel.	13
Figure 9	Antibodies (Immunoglobulins; Igs) classification according to their heavy chain isotype.	14
Figure 10	Typical antibody (Ig) structure.	15
Figure 11	Camelids IgGs; Conventional IgG ₁ and HCABs (IgG ₂ and IgG ₃).	16
Figure 12	Differences between Conventional IgGs and HCABs.	17
Figure 13	Difference between the HCABs and Nanobodies.	18
Figure 14	Pregnant Dromedary She-camels housed at the (Animal Production Research Station) in Matrouh Governorate, Egypt.	53
Figure 15	Levucell SC20 (Live yeast; <i>Saccharomyces cerevisiae</i>).	54
Figure 16	Titer of rabbit anti-camel polyclonal antibody (pAb) produced by indirect ELISA, before Immunization (immun.) and after each booster dose.	61
Figure 17	SDS-PAGE (12.5%); anti-camel polyclonal antibody showing bands assignments according to different Molecular weight (Mwt) before and after purification (stained with Coomassie Blue).	67

Figure 18	Dams' Body weight (Bwt) (mean \pm SE) in the experimental groups at different times.	74
Figure 19	Dams' total Body weight (Bwt) gain (mean \pm SE) in the experimental groups pre- & post- calving.	74
Figure 20	Calves' birth weights (mean \pm SE) in the experimental groups.	75
Figure 21	Mean (\pm SE) of IgG concentrations in dams' plasma at different times from the expected calving date.	78
Figure 22	Mean (\pm SE) of IgG concentrations transferred into milk of lactating dams.	79
Figure 23	Mean (\pm SE) of IgG concentrations in calves' plasma during early lactation.	81
Figure 24	Mean (\pm SE) of IgA concentrations in dams' plasma at different times from the expected calving date.	83
Figure 25	Mean (\pm SE) of IgA concentrations transferred into milk of lactating dams.	84
Figure 26	Mean (\pm SE) of IgA concentrations in calves' plasma during early lactation.	86
Figure 27	Mean (\pm SE) of IFN-γ concentrations in dams' plasma at different times from the expected calving date.	88
Figure 28	Mean (\pm SE) of IFN-γ concentrations transferred into milk of lactating dams.	89
Figure 29	Mean (\pm SE) of IFN-γ concentrations in calves' plasma during early lactation.	91

List of Tables

		Page
Table 1	The mean values of pro-inflammatory cytokines in healthy dromedary camels.	20
Table 2	Definitions of beneficial microorganisms and substances used for affecting the immunity.	28
Table 3	Effect of using some Direct Fed Microbial (DFM) Probiotics on ruminants.	34
Table 4	Time durations of blood and milk sampling and body weight (Bwt) recording.	56
Table 5	Comparison between Dams' Body weight (Bwt) and their calves' birth weights in the experimental groups at different times from the expected calving date.	73
Table 6	Plasma IgG concentrations (ng/ml) in She-camels of the experimental groups during different times from the expected calving date.	77
Table 7	Concentrations of IgG (ng/ml) transferred into dams' milk during early lactation.	79
Table 8	Plasma IgG concentrations (ng/ml) in newborn calves during early lactation.	80
Table 9	Plasma IgA concentrations (ng/ml) in She-camels of the experimental groups during different times from the expected calving date.	82
Table 10	Concentrations of IgA (ng/ml) transferred into dams' milk during early lactation.	84
Table 11	Plasma IgA concentrations (ng/ml) in newborn calves during early lactation.	85
Table 12	Plasma IFN-γ concentrations (ng/ml) in She-camels of the experimental groups during different times from the expected calving date.	87
Table 13	Concentrations of IFN-γ (ng/ml) transferred into dam's milk during early lactation.	89
Table 14	Plasma IFN-γ concentrations (ng/ml) in newborn calves during early lactation.	90

CONTENTS

	Page
I. INTRODUCTION AND AIM OF WORK	1
II. REVIEW OF LITERATURE	
A. Dromedary Camel	6
1. Distribution of Camels Worldwide	7
2. Economic Importance of Camel	9
B. Camel Immunity	9
• Lymphoid Organs	10
1. Thymus	10
2. Spleen	11
3. Lymph Node	12
• Immune Molecules	14
4. Immunoglobulins (Antibodies)	14
4.1. Immunoglobulins in Camel	15
4.2. Heavy Chain Antibody (HCAb)	16
5. Cytokines in Camel	19
6. Complement System in Camel	20
• Stress of Pregnancy on Immunity	20
• Immunity in Newborn Calves	22
• Mortality in Newborn Calves	23
• Natural Passive Immunization of newborns	24
C. Probiotics: An Overview	28
1. Definitions of Pro-, Pre- and Synbiotics	28
2. Classification of Probiotics	29
3. Ideal Probiotic	30
4. Mode of Action of Probiotics	31
5. Beneficial Effects of Probiotics on Animals' Performance	33
6. Probiotics as Immune Enhancers	35
6.1. Probiotics in Innate Immunity	36
6.2. Probiotics in Adaptive Immunity	37
7. Effect of Probiotics on Production Performance	39
7.1. Effect on Growth	40
8. Effect of probiotics on maternal health and immunity during pregnancy	42

D. Models of Probiotics Used in Animal Feeding	44
1. <i>Saccharomyces cerevaiase</i> (an example of Fungi)	44
1.1. Identification and Economic Importance	44
1.2. Safety	45
1.3. Yeast Immune Recognition and Immuno-modulation	45
1.4. Effect of Yeast Administration on Productive Performance and Animal Health	47
2. <i>Bacilli</i> species (an example of Bacteria)	49
2.1. Identification and Economic Importance	49
2.2. Safety	49
2.3. <i>Bacilli</i> Immune Recognition and Immuno-modulation	50
2.4. Effect of <i>Bacilli</i> Administration on Animal Production Performance	52
III. MATERIALS AND METHODS	
1. Animals	53
2. Probiotics	54
2.1. Probiotic “A” (Fungus; <i>Saccharomyces cerevaiase</i>)	54
2.2. Probiotic “B” (Bacteria; <i>Bacillus subtilis</i> & <i>Bacillus licheniformis</i>)	55
3. Experimental Design	55
3.1. Animals' Grouping	55
3.2. Experimental Durations	56
4. Body Weighing of Dams and Calves	56
5. Samples Collection, Preparation and Storage	57
5.1. Blood Sampling	57
5.2. Colostrum and Milk Sampling	57
• Whey Preparation Method	57
6. Protein Content Determination	57
7. Production of anti-Camel Polyclonal Antibodies (pAb)	59
7.1. Immunization of Rabbits for Production of (pAb)	60
7.2. Purification of Rabbit anti-Camel Serum	61
8. Characterization of anti-Camel pAb by Sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE)	63
9. Labeling of pAb with Horseradish peroxidase (HRP).	67

10. Enzyme linked immunosorbent assay (ELISA)	68
11. Statistical Analysis	71

IV. RESULTS

1. Effect of Probiotics (<i>Saccharomyces cerevisiae</i> or <i>Bacilli</i> mixture) Administration to Pregnant She-camels on their Body weight (Bwt) and Birth weight of their Newborns.	72
1.1. Effect of probiotics administration to pregnant She-camels on their Bwt, during peri-parturation.	72
1.2. Impact of probiotics administration to pregnant She-camels on their newborns' birth weight.	75
2. Effect of Probiotics (<i>Saccharomyces cerevisiae</i> or <i>Bacilli</i> mixture) Administration to She-camels on the Immunological Parameters of them and their Newborns.	76
2.1. Effect of probiotics administration to She-camels on IgG levels in their plasma during peri-parturation.	76
2.2. Effect of probiotics administration to She-camels on IgG levels transferred into their milk during early lactation.	78
2.3. Effect of probiotics administration to She-camels on IgG levels in plasma of their newborn calves.	80
2.4. Effect of probiotics administration to She-camels on IgA levels in their plasma during peri-parturation.	81
2.5. Effect of probiotics administration to She-camels on IgA levels transferred into their milk during early lactation.	83
2.6. Effect of probiotics administration to She-camels on IgA levels in plasma of their newborn calves.	85
2.7. Effect of probiotics administration to She-camels on IFN- γ levels in their plasma during peri-parturation.	86
2.8. Effect of probiotics administration to She-camels on IFN- γ levels transferred into their milk during early lactation.	88
2.9. Effect of probiotics administration to She-camels on IFN- γ levels in plasma of their newborn calves.	90

V. DISCUSSION	92
VI. CONCLUSION AND RECOMMENDATION	113
VII. SUMMARY	114
VIII. REFERENCES	118
X. الملخص العربي	
XI. المستخلص العربي	

ABSTRACT

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Title of Thesis: **The Influence of Probiotics on the Immunity and Vitality of Pregnant She-camels during Peri-partum Period and Its Reflection on Their Newborn Calves.**

Degree: **Ph.D. in Zoology (Immunology).**

Pregnancy in dromedary camel is associated with down-regulation of immune responses that may lead to susceptibility to viral and bacterial infections. So, it has been proposed that probiotic application might help in strengthening the immunity and performance of pregnant she-camels and their newborns. A total of 15 dams at late gestation (2 months pre-calving) to one month post-calving were divided into three equal groups: G₁ (control) was fed the basal diet recommended by APRI; G₂ was fed the basal diet supplemented with yeast (0.5 gm/head/day) and G₃ was fed the basal diet supplemented with *Bacilli* mixture (Enhancer1.3, 10 g/head/day). Dams' plasma and milk and calves' plasma were collected at certain durations. Results revealed higher significant maternal body weights (kg) in G₂ and G₃ compared to G₁: at one month pre-calving and one month post-calving. Non-significant changes were detected between the 3 experimental groups at calving. Moreover, calves' birth weights were higher in G₂ and G₃ compared to G₁. The immunological investigation revealed that dams plasma IgG levels (ng/ml) at one month pre-calving, one week and one month post-calving were higher in G₂ and G₃ than G₁. In milk, IgG levels during early lactation showed significant changes between the 3 groups at one week post-calving. For calves, IgG levels showed significant increases in G₂ and G₃ more than G₁ at: birth, one week and one month post-calving. In dams, IgA levels showed non-significant changes in the 3 experimental groups either in plasma or milk. While, in calves, there was a significant increase in G₂ compared to G₃ and G₁, at one month after birth. For IFN- γ : dams, G₂ and G₃ showed significant increases more than G₁ at calving and one week post-calving. IFN- γ levels didn't change over the experimental period between the 3 groups in milk or calves' plasma. The conclusion of this study indicates that the inclusion of Yeast or *Bacilli* mixture-based in the basal diet of dromedary she-camels during the peri-parturition period is effective in improving their body weight and immune responses. Additionally, the maternal health improvement may be reflected on their newborn birth weight and some immune responses. Moreover, Yeast or *Bacilli* mixture may affect IgG levels in Camel's milk. Therefore, we emphasize the inclusion of probiotics in the regular diet of pregnant she-camels in order to enhance their immunity and health, which positively affects the vitality of their newborns. This systemic chain supports the economic value of breeding this great animal.

Keywords: She-camel; Probiotics; Newborn; Immunity; Production performance.

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