DEDICATION

إلى روح أمي

وأبى

ACKNOWLEDGEMENT

First and foremost I should greatly thank the Almighty Allah for giving me the strength , patience and confidence to finish this study .

I also thank my supervisor , Dr. Hatim Idris for his support and guidance .

I would like to express my grateful thanks to Dr. Yahya Sabil the head of Bacteriology Department , Veterinary Research Institute Soba , for his kind support and useful helping .

My sincere appreciation to the staff of Bacteriology Department In (V R I) for helping me in this research .

I am deeply grateful to my family for their support , encouragement and urge through this study .

COTENTS

Table of Contents	Page Number
Title	I
Dedication	II
Acknowledgement	III
Contents	IV
List of Tables	VI
Abstract in Arabic	VII
Abstract in English	IX
Chapter One :1. Introduction	1
Chapter Two : Literature Review	3
Consumption of raw milk .2.1	
Health benefits of raw camel’s milk .2.2	3
Health benefits of raw cow’s milk .2.3	5

Raw milk hazards 2.3.1 6

Microorganisms associated with diseases in .2.4 6
:cow’s raw milk

Bacillus cereus .2.4.1 7

Brucella .2.4.2 7

Campylobacter jejuni .2.4.3 7

E. coli O157:H7 .2.4.4 8

Listeria monocytogenes .2.4.5 8

Mycobacterium tuberculosis .2.4.6 8

*Salmonella*e .2.4.7 9

Staphylococcus aureus .2.4.8 9

Yersinia enterocolitica .2.4.9 9

Streptococcus pyogenes .2.4.10

Microorganisms associated with diseases in .2.5 10
camel’s raw milk

Prevention of milk borne infectious diseases .2.6 10

Grading of raw milk .2.7 11

Bacteriological quality of raw milk in Sudan .2.8 11

:Microbiological testing of raw milk .2.9 12
(Standard plate count (SPC .2.9.1 12
(Direct microscopic count (DMC.2.9.2 12
Psychrotrophic estimates.2.9.3 13
Coliforms .2.9.4 13
Sensory evaluation .2.9.5 13
(Preliminary incubation (PI–SPC .2.9.6 14
Adenosinetriphosphatebioluminescenceassays.2.9.7 14
:Sources of raw milk contamination .2.10 15
Environmental sources .2.10.1 15
The Udder .2.10.2 15
Milking equipments .2.10.3 16
Chapter Three: Materials and methods 17
Samples collection .3.1 17
(Standard plate count (SPC .3.2 17
: Laboratory examination .3.3 17
Isolation of the bacteria .3.3.1 17

: Characterization tests.3.3.2 17

Gram staining 3.3.2.1 17

Catalase test .3.3.2.2 18

Oxidase test .3.3.2.3 18

(Oxidation / Fermentation test (O/F .3.3.2.4 19

Glucose test .3.3.2.5 19

Motility test .3.3.2.6 19

Growth in 6.5% Nacl test .3.3.2.7 20

Indole test .3.3.2.8 20

Nitrate reduction test .3.3.2.9 20

Arginine test .3.3.2.10 20

Urease activity test .3.3.2.11 21

Citrate test .3.3.2.12 21

Growth on MacConkey agar .3.3.2.13 21

Sensitivity test .3.3.2.14 21

Triple Suger Iron (TSI) test .3.3.2.15 21

Voges-Proskauer test .3.3.2.16 22

Coagulase test .3.3.2.17 22

Statestical analyses .3.4 22

Chapter Four : Rsults and Discussion 23

The bacteria isolated from cow's and camel's raw milk .4.1 23

The total plate count of camel‘s milk .4.3 24

The total plate count of cow‘s milk .4.4 24

.Discussion 4.5 33

Chapter Five : Conclusion and Recommendations 35

References 36

LIST OF TABLES

No	Tables Descriptions of	Page Number
1	Statistical analyses	**24**
2	The bacteria isolated from cow's and camel's raw milk	**27**
3	Biochemical reactions of the isolated bacteria	**30**

from raw cow's milk

4 Biochemical reactions of the isolated bacteria from camel's raw milk **31**

الملخص العربي

هدفت هذه الدراسة إلى قياس جودة الحليب الخام المستهلك العادي في مدينة بحري .

جمعت 20 عينة حليب خام من منطقة بحري : 10 عينات من حليب الإبل و 10 عينات من حليب البقر .

أجرى العد البكتيري الكلى لعينات الحليب الخام المجمع من البقر والإبل .

عينات الحليب اجري الفحص المختبرى عليها لقياس المحتوى البكتيري عن طريق العد البكتيري الكلى . وكذلك معرفة أنواع البكتيريا الموجودة بالعينات عن طريق الكشف البيوكيميائى .

العد البكتيري الكلى تمت مقارنته بالمواصفات السودانية والأمريكية .

العد البكتيري لحليب البقر تراوح بين 1.5×0.2 - $10^5\times$ cfu/ml $10^5\times$ cfu/ml

العد البكتيري لحليب الإبل تراوح بين $10^5\times 0.2$ cfu/ml × 1.5 - 10^5 cfu/ml

معظم عينات حليب الإبل وحليب البقر صنفت على أنها جيدة لأنها تحتوى على عد بكتيري أقل من $10^5\times 0.5$ cfu/ml .

أوضحت نتائج التحليل الإحصائي للعد البكتيري الكلى لحليب الإبل والبقر الخام لا توجد أي فروق معنوية بين حليب الإبل والبقر الخام وكان نسبة الفرق المعنوى 0.336؛حيث أن نتيجة حليب الإبل كانت $10^8\times 50$ وحليب البقر كانت $10^9\times 30$.

في حليب البقر تم عزل البكتيريا وهى , *Staphylococcus spp*. 8(30.8%), *Streptococcus spp.* 4(15.4%) *Enterococcus spp.* 4(15.4%) , , *Acinobacter spp.* 2 (7.7%) , *Pseudomonas bacteria spp* 2(7.7%), *Yersenia pseudotuberculosis spp.* 2 (7.7%) , *proteus morganii bacteria spp.* 2 (7.7%) , *Aerococcus spp.* 2 (7.7%)

وقد دلت النتائج أن نسبة البكتيريا موجبة الجرام هي 50% والسالبة الجرام نسبتها 50%في حليب البقر.

في حليب الإبل فقد تم عزل البكتيريا التالية *Staphylococcus spp* 4(16.7%) *Aerococcus spp* 4 (16.7%) *Listeria spp* 2(8.3%) , *Klebsiella spp* 2(8.3%) , *Micrococcus spp* 4 (16.7%), *Enterococcus spp* 4(16.7%) ,*Vibreo metschnikovis spp* 2 (8.3%) and *Yersenia spp* 2(8.3%) .

وقد دلت النتائج أن نسبة البكتيريا موجبة الجرام 75%والسالبة الجرام نسبتها 25% في حليب الإبل .

ABSTRACT

This study was aimed to determine the bacteriological aspect of raw milk in Bahry town .

Twenty samples of raw milk were collected ,10 samples from cow's milk and 10 from camel's milk . total bacterial count of cow's and camel's raw milk were determined .

Milk samples were analyzed for microbial quality attributes including total plate count (TPC).Also the bacteria were isolated and identified according to thier biochemical reactions .

The total plate count was compared by The Sudanese and American Standards

The results of the total plate count for camel milk were 0.2×10^5 cfu/ml to 1.5×10^5 cfu/ml and 0.2×10^5 cfu/ml to1.5×10^5 cfu/ml for cow milk . Most of camels and cows milk samples were classified as good because the total bacterial .count was less than 0.5 $\times10^5$ cfu/ml

The statistical analysis of the total bacterial count showed no significance variation between cow's and camel's raw milk with level of significance (NS) 0.336 . The camel's milk result . was 50× 10^8 and cow's milk result was 30×10^9

The bacteria isolated from cow's milk were *Staphylococcusspp.* 8 (30.8%) , *Streptococcus spp.*4(15.4%) , *Enterococcus spp.*4(15.4%) , *Aerococcus spp.* 2 (7.7%),*Acinobacter spp.* 2(7.7%), *Pseudomonasbacteria spp.*2(7.7%),*Yersenia pseudotuberculosis spp.* 2(7.7%) and . (*proteus morganii* 2(7.7%

The results showed that the gram (-)ve bacteria in cow's milk . were 50% and gram (+)ve bacteria were 50%

The bacteria isolated from camel's milk were *Staphylococcus spp.* 4 (16.7%) , *Aerococcus spp.* 4 (16.7%) , *Listeria spp.* 2 (8.3%) , *Klebsiella spp.* 2 (8.3%) , *Micrococcuc spp.* 4 (16.7%),

Enterococcus spp. 4 (16.7%) ,*Vibreometschnikovis spp.*2

. ((8.3%) and *Yersenia spp.* 2 (8.3%

The gram (+ve) bacteria were 75% while gram (-ve) bacteria

. in camel's milk were 25%