

---

**ANTIMICROBIAL RESIDUE CONTAMINANTS OF RAW MILK DELIVERED BY  
SMALL SCALE DAIRY FARMERS TO THE MILK COLLECTION CENTRES IN  
KUMI MUNICIPALITY, UGANDA**



**BY**

**OKAASAI PIUS**

**BU/UP/2016/192**

**SUPERVISOR: DR. OMADANG**

**A DISSERTATION SUBMITTED TO THE DEPARTMENT OF ANIMAL  
PRODUCTION AND MANAGENT FACULTY OF AGRICULTURE AND ANIMAL  
SCIENCES IN PARTIAL FULFILLMENT FOR THE AWARD OF A BACHELOR'S  
DEGREE IN ANIMAL PRODUCTION AND MANAGEMENT BUSITEMA  
UNIVERSITY**

**AUGUST, 2018**

**DECLARATION**

This is my original work and has not been presented for award of a degree in any other university

Signature..... Date.....

The declaration above is confirmed by

DR.LEONARD OMANDANG (Supervisor).....

DATE.....



**APPROVAL**

This dissertation has been prepared under the guidance of and approved for submission to the department of animal production and management by:

Dr. OMANDANG LEONARD

Signature.....

Date.....

## LIST OF TABLES AND FIGURES

Table 1: showing Maximum Residues Limits for Antimicrobial Veterinary Drugs in Milk.....	7
Table 2: showing the Summary of Acidity ... ..	21
Table 3: showing Summary of Acidity incubation.....	21
Table 4: showing Summary of microbial load.....	22
Figure 1: showing the map of Uganda locating kumi district.....	9
Figure 2: showing Zone of inhabitation around wells containing milk sample after 48hours of incubation.....	12
Figure 3: showing Serial dilutions of milk samples in 4 tubes containing 9 ml of normal saline each.....	13
Figure 4: showing graphical representation of the results obtained showing difference in acidity of raw milk and incubated milk with starter culture.....	16
Figure 5: Graphical representation of the results obtained showing the microbial load.....	16

## **LIST OF ABBREVIATIONS**

Std.-standard deviation

Dev. -deviations

Freq.-frequency

FAO.-food and agriculture organization

MRL.-Maximum residue limit

Vet. -veterinary

## **ACKNOWLEDGEMENT**

I take this opportunity to sincerely appreciate all those who contributed in one way or another in the success of my research topic. My efforts could not have yielded any fruits without your involvement, guidance, provision of the necessary equipments and materials, reading and interpretation of results, encouragement, advice, corrections. My success was simply from team work. Special regards to;

- My supervisor Dr.Omandang
- Dr. Muyinda Robert.
- My Guardian kedichristine and my auntie for encouragement and financial assistance.

## **Table of Contents**

DECLARATION .....	i
APPROVAL .....	ii
LIST OF TABLES AND FIGURES .....	iii
LIST OF ABBREVIATIONS.....	iv
ACKNOWLEDGEMENT .....	v
ABSTRACT.....	viii
CHAPTER ONE .....	1
1.0 INTRODUCTION .....	1
1.1 PROBLEM STATEMENT .....	1
1.2 OBJECTIVES .....	2
1.3 JUSTIFICATION.....	2
1.4 Research questions.....	2
1.5 Hypotheses .....	3
1.6 Significance.....	3
CHAPTER TWO.....	4
2.0 Milk.....	4
2.1 Composition of Milk.....	4
2.2 Commonly used antimicrobial agents in dairy Cattle.....	4
2.3 Benefits and Risks of Antibiotics.....	4
2.5 Withdrawal time.....	6
2.6 Method of detecting anti –microbial residues.....	8
CHAPTER THREE.....	9
3.0 Study area.....	9

3.1 Research Design.....	10
3.2 Research approach .....	10
CHAPTER FOUR.....	16
4.0 THE RESULTS.....	16
CHAPTER FIVE .....	17
5.0 DISCUSSION OF THE RESULTS.....	17
CHAPTER SIX.....	18
6.0 CONCLUSION.....	18
6.1 RECOMMENDATIONS .....	18
REFERENCES .....	19
APPENDEX.....	21



## **ABSTRACT**

Milk is an important source of nutrients to human and animals, but due to its high water activity and nutritional value it serves as an excellent medium for growth of much kind of microorganisms under suitable conditions. The present study involved cross sectional study to determine antimicrobial residue levels.

This study was conducted to determine the presence of antibiotic residues levels in Cattle milk sold in kumi, as these residues may have a negative impact on human's health. Milk samples were randomly collected from four collection centers. 10 samples were collected from each collection center then each sample was taken laboratory analysis of antibiotic residues. Laboratory assessment included, screening qualitative test on all these samples testing for the presence of residues of antibiotics by using the inhibitory activity and the micro-biological methods. Among the milk samples collected from collection centers, samples from one collection center was found positive, while all sample of from other collection centers were negative hence 19.1% of milk collected was containing antimicrobial residues. Screening for residues at the milk collection centers is recommended and further investigation of the milk production practices among small-scale dairy farmers is required. This will provide a basis for designing appropriate and effective small scale milk production practices which will reduce milk contamination and help to protect the health of consumers in kumi

## **CHAPTER ONE**

### **1.0 INTRODUCTION**

Milk has a complex biochemical composition and its high water activity and nutritional value serves as an excellent medium for growth and multiplication of many kinds of microorganisms when suitable conditions exist (Özlem et al., 2014). It is a healthy and nutritious daily drink that is consumed all over the world and by the people of all ages. More than 6 billion people worldwide consume milk and milk products; the majority of them live in developing countries (Priyanka, Panigrahi, Sheoran, & Ganguly, 2017). Milk adulteration is a worldwide concern and social problem. It exists both in the developing and developed countries. Due to lack of adequate monitoring and policies backward countries are at higher risk. Higher demand, growth in competition in dairy industry and financial profits makes some producers to adulterate the milk (Reddy, Venkatesh, Venkata, & Reddy, 2017).

### **1.1 PROBLEM STATEMENT**

The frequent use of antibiotics may result in drug residues that can be found at different concentration levels in products of animal origin, such as milk or meat. Presence of drugs or antibiotics residues in food above the maximum level recognized world-wide by various public authorities is illegal (Ridhiwani, 2015).

Antimicrobials in milk cause negative effects such as allergic reactions, toxicity, carcinogenic effects, selection of resistant bacteria, disruption of human normal flora, provoke immunological response and inhibition of the starter culture when they are beyond the Maximum Residue Limit (Tolosa et al, 2014).

## REFERENCES

- Alsadig, M., Almanzool, A., & Ahmed, A. K. (2016). *No Title.* (September).
- Kebede, G., Zenebe, T., Disassa, H., & Tolosa, T. (2014). Review on Detection of Antimicrobial Residues in Raw Bulk Milk in Dairy Farms. *African Journal of Basic & Applied Sciences*, 6(4), 87–97. <https://doi.org/10.5829/idosi.ajbas.2014.6.4.8642>
- Olatoye, I. O., Daniel, O. F., & Ishola, S. A. (2016). *Screening of antibiotics and chemical analysis of penicillin residue in fresh milk and traditional dairy products in Oyo state, Nigeria.* 9, 948–954. <https://doi.org/10.14202/vetworld.2016.948-954>
- Özlem, O., Haydari, N., Sözeri, C., Mattoni, A., Tréré, E., Gencer, Z. T., ... Yanıkkaya, B. (2014). N聚氨酯/乙烯-辛烯共聚物共混体系的结构、性能及表征o Title. *Telematics and Informatics*, 19(1), 27–40. <https://doi.org/10.1177/1742766510373715>
- Padol, A., Malapure, C., Domple, V., & Kamdi, B. (2015). Occurance, public health implications and detection of antibacterial drug residues in cow milk. *Environ. We Int. J. Sci.*, 7112, 22. Retrieved from <http://www.ewijst.org/issues/vol10/ewijst100124045.pdf>
- Pharma Science Monitor. (2011). *Pharma Science Monitor*, 5(3), 184–197.
- Priyanka, Panigrahi, S., Sheoran, M. S., & Ganguly, S. (2017). Antibiotic residues in milk- a serious public health hazard. *Journal of Environment and Life Sciences*, 2(4), 99–102. Retrieved from <http://www.imedpharm.com/journals/index.php/JELS/article/view/94>
- Reddy, M., Venkatesh, K., Venkata, C., & Reddy, S. (2017). Adulteration of milk and its detection: A review. *International Journal of Chemical Studies*, 5(4), 613–617. Retrieved from <http://www.chemijournal.com/archives/2017/vol5issue4/PartJ/5-3-158-426.pdf>
- Alsadig, M., Almanzool, A., & Ahmed, A. K. (2016). *No Title.* (September).
- Kebede, G., Zenebe, T., Disassa, H., & Tolosa, T. (2014). Review on Detection of Antimicrobial Residues in Raw Bulk Milk in Dairy Farms. *African Journal of Basic & Applied Sciences*, 6(4), 87–97. <https://doi.org/10.5829/idosi.ajbas.2014.6.4.8642>
- Olatoye, I. O., Daniel, O. F., & Ishola, S. A. (2016). *Screening of antibiotics and chemical*

*analysis of penicillin residue in fresh milk and traditional dairy products in Oyo state , Nigeria. 9, 948–954. <https://doi.org/10.14202/vetworld.2016.948-954>.*

- Özlem, O., Haydari, N., Sözeri, C., Mattoni, A., Tréré, E., Gencer, Z. T., ... Yanıkkaya, B. (2014). N聚氨酯/乙烯-辛烯共聚物共混体系的结构、性能及表征. *Telematics and Informatics, 19*(1), 27–40. <https://doi.org/10.1177/1742766510373715>
- Padol, A., Malapure, C., Dimple, V., & Kamdi, B. (2015). Occurance, public health implications and detection of antibacterial drug residues in cow milk. *Environ. We Int. J. Sci., 7112*, 22. Retrieved from <http://www.ewijst.org/issues/vol10/ewijst100124045.pdf>
- Priyanka, Panigrahi, S., Sheoran, M. S., & Ganguly, S. (2017). Antibiotic residues in milk- a serious public health hazard. *Journal of Environment and Life Sciences, 2*(4), 99–102. Retrieved from <http://www.inedpharm.com/journals/index.php/JELS/article/view/94>
- Reddy, M., Venkatesh, K., Venkata, C., & Reddy, S. (2017). Adulteration of milk and its detection: A review. *International Journal of Chemical Studies, 5*(4), 613–617. Retrieved from <http://www.chemijournal.com/archives/2017/vol5issue4/PartI/5-3-158-426.pdf>
- Submitted, T. (2008). *INVESTIGATION OF THE PYHSICAL AND CHEMICAL PROPERTIES OF MILK CONTAINING ANTIBIOTICS A Thesis Submitted to in Food Engineering*. (December).