WATER AND FORMALIN ADULTERATION OF MILK SOLD IN MARKETS AROUND SOROTI CITY

BY

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A RESEARCH DISSERTATION SUBMITTED TO THE FACULTY OF AGRICULTURE AND ANIMAL SCIENCES IN PARTIAL FULFILLMENT FOR THE AWARD OF ABACHELOR'S DEGREE IN ANIMAL PRODUCTION AND MANAGEMENT OF BUSITEMA UNIVERSITY.

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ABSTRACT

This research was carried out from Soroti city in eastern Uganda. It involved collecting fresh milk samples randomly from farmers, vendors and then dairy shops and qualitatively determining formalin and water adulterants, determining the most commonly used adulterant of fresh milk in the collected samples and determining the Specific gravity of milk adulterated with water and the key players in adulteration of fresh milk sold in markets around Soroti city Among the farmers, vendors and dairy shops. This experiment was carried out for a period of one month from 3rd October to 2nd November collecting milk samples from the three categories to qualitatively assess the extent of adulteration of fresh milk with water and formalin in markets around Soroti city. A total of thirty fresh milk samples were collected from farmers, vendors and dairy shops in markets around Soroti city; ten samples were randomly collected from each category. Water was detected by lactometer reading. Milk was poured into a (100 ml) measuring cylinder and a lactometer dropped in the milk to slowly sink. The lactometer reading was taken and recorded in Lactometer degree (°L) when the reading was below the standard then the sample was considered to be adulterated with water. Lactometer was used to determine the specific gravity of milk detected with water. Lactometer consists of a long narrow graduated glass stem Formalin was detected by adding 5mls conc. sulfuric acid with a little amount of ferric chloride was added to a 10 ml milk sample in a test tube without shaking. The appearance of violet or blue color at the junction of two liquid layers indicated the presence of formalin. The mean Specific gravity was 1.0262 and 1.0226 for milk obtained from farmers and vendors respectively which were lower than the standard (28 to 32) while the mean specific gravity of milk obtained from the dairy shops was within the range of pure milk which is 28to 32. The results clearly suggest that water was the most common adulterant in almost all sample of raw milk collected. 80%, 60% and 30% of the samples from vendors, farmers and dairy shops respectively were adulterated with water because their lactometer reading were below the standard and that vendors adulterate milk most with water. However, none of the samples contained formalin. It could therefore be inferred that the consumers need to be more cautious regarding the quality of raw milk. Awareness, access to information, proper monitoring can be subsidiary to control this unethical practice. It is also recommended to monitor the corrected lactometer reading (CLR) at different level of milk collection regularly.

DECLARATION

I, TAKOBERWA MADINAH, declare that this research dissertation is to the best of my knowledge my efforts. It has never been submitted to any institution of learning for the award of Graduate, Undergraduate, Diploma, or Certificate program.

Sign……. …….. Date……

TAKOBERWA MADINAH

BU/UP/2019/1043

APPROVAL

The entire work relating to this research dissertation development, implementation, and report writing has been done by TAKOBERWA MADINAH under the supervision of DR.ZIRINTUNDA GERALD and has met all the necessary Busitema University guidelines for research, I, therefore, approve it accurate for submission to the Department of Animal Production and Management of Busitema University.

Sign; ……. Date; …….

DR.ZIRINTUNDA GERALD

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DEDICATION

To God almighty, for the power in His word and His able ability to keep me alive to see this accomplishment, He's granted me good health, cared for, and protected me through this entire period of my course. I truly believe that without Him I am nothing.

To my lovely dad, Mr. Kauta Farouk you are a great man indeed, you taught me moral standards, commitment, positive thinking, hard work, and endurance at all times, and these were just needed not only in my research dissertation but they are elements I will always employ for a successful life. Thank you very much, daddy.

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LIST OF ABBREVIATIONS

%	Percentage
SPSS	Statistical package for social sciences
°C	Degrees Centigrade.
CRD	Completely Randomized Design
CV	Coefficient of Variation
E.g.	For example
Etc.	And so on
IgA.	Immunoglobulin A

CONTENTS

CHAPTER ONE: INTRODUCTION.

1.1 Background.

Cow milk in its natural form is highly nutritious supplying nutrients in significant amounts than human milk. These include proteins, fats, carbohydrates, and vitamins (*Chauhan et al., 2019*) making it a complete diet crucial for the proper growth of infants and grownups as well. Milk is obtained from various milk-producing animals like cows, buffalo, goats, etc. *(Chugh and Kaur, 2022*) and it contains many antibodies like Iimmunoglobulin A (IgA)which helps in fighting against disease in infants. However, milk is so vulnerable to bacterial contamination and its quality deterioration begins just after milking (*Batra et al, 2017*) when it is performed in unhygienic situations.

Besides some accidental negative factors that affect the quality of milk, we also encounter its deliberate adulteration (*Fehér Pindešová et al., 2022*). Milk is often deliberately subjected to fraud (employing adulteration) for lack of proper hygienic conditions of processing, storage, transportation and marketing, and other reasons. Food adulteration is a bigger problem that the world faces and developing countries are at higher risk related to this problem due to a lack of good monitoring and policies (Azad and Ahmed, 2016). Water is the most common adulterant used which dilutes and decreases the nutritional value of milk(*Abdallah Musa Salih & Yang, 2017a*)

Adulteration of milk is a global concern and social problem, sometimes done intentionally or as a result of ignorance (*Reddy et al., 2017*).*Raturi and Aman 2022*, mentions that adulteration of milk is common in developing countries. According to (Abbas et al. 2013), formalin as one of the adulterants was detected the highest with 28.33% in raw cow milk compared to starch(26.67%) and other adulterants, which not only causes major economic losses for the processing industry, but also a major health risk for the consumers. Milk adulterated with contaminated water is a serious health hazard because of potential waterborne diseases. (*Barham et al., 2014*). Water constitutes 87% of milk. Adulterated milk is very low in nutritive value. This malpractice dilutes and deteriorates the quality of milk and it may cause serious health hazards if added water is contaminated with pathogens, metals, etc.

To compensate for the density and color of diluted milk, other chemicals like starch, hydrogen peroxide, synthetic powders, gentamicin, and vegetable oils in place of fat may be added. These may decrease the shelf life of milk and cause serious health risks to consumers like kidney stones

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