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**ONCE DAILY MILKING IN LATE LACTATION :
EFFECTS ON SOMATIC CELL COUNTS, MILK
YIELD AND COMPOSITION OF DAIRY COWS WITH
HIGH OR LOW SOMATIC CELLS COUNTS**

**A THESIS PRESENTED IN PARTIAL
FULFILMENT OF THE REQUIREMENTS FOR THE
DEGREE OF MASTER OF AGRICULTURAL
SCIENCE IN ANIMAL SCIENCE
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HALIMA IDD KAMOTE

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DEDICATED TO MY MOTHER

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TABLE OF CONTENTS

	PAGE
TITLE PAGE	i
DEDICATION	ii
ABSTRACT	iii
ACKNOWLEDGEMENTS	v
TABLE OF CONTENTS	vi
LIST OF TABLES	ix
LIST OF FIGURES	x
CHAPTER 1	1
1.1 INTRODUCTION	2
1.2 ORGANISATION OF THE THESIS	3
CHAPTER TWO REVIEW OF THE LITERATURE	4
2.1 THE MAMMARY GLAND	5
2.2 SIGNIFICANCE OF SCC	7
2.2.1 SCC in relation to milk yield	7
2.2.2 Relationship between SCC and milk composition	8
2.2.3 SCC and processing properties of milk	9
2.3 SOMATIC CELLS ORIGIN AND OCCURRENCE IN MILK	10
2.4 INTERPRETATION OF SCC	12
2.4.1 Quarter sample	12
2.4.2 Composite udder or cow samples	13
2.4.3 Bulk, herd, milk samples	13
2.5 FACTORS AFFECTING NUMBER OF SOMATIC CELLS IN MILK	14
2.5.1 Intramammary infection	14
2.5.2 Stage of lactation	15
2.5.3 Age or lactational number	15
2.5.4 Diurnal variation	16
2.5.5 Stress related factors	17
2.5.6 Management factors	17

2.5.7	Milking frequency	18
2.6	EFFECT OF MILKING FREQUENCY ON YIELD AND COMPOSITION OF MILK	19
2.6.1	Three times milking	19
2.6.2	Twice daily milking	21
2.6.3	Once daily milking	21
2.7	PHYSIOLOGICAL EXPLANATIONS FOR DIFFERENCES IN THE EFFECTS OF MILKING FREQUENCY	22
2.7.1	Hormonal effect	22
2.7.2	Intramammary pressure	23
2.7.3	Udder storage capacity	24
2.7.4	Chemical inhibitor	25
2.7.5	Differentiation and growth of secretory cells	26
2.7.6	Extended milking intervals as an initial stage of involution	27
2.8	RATIONALE FOR THE PRESENT STUDY	29
CHAPTER 3 MATERIALS AND METHODS		30
3.1	ANIMALS	31
3.2	EXPERIMENTAL DESIGN AND PROCEDURE	31
3.2.1	Determination of milk yield and composition	32
3.2.2	Somatic cell counts	33
3.2.3	Bacteriology analyses	33
3.3	STATISTICAL ANALYSES	34
CHAPTER 4 RESULTS		36
4.1	INCIDENCE OF INFECTION	37
4.2	TREATMENT PERIOD	37
4.3	POST-TREATMENT	43
4.4	SOMATIC CELLS	43

CHAPTER 5	GENERAL DISCUSSION AND CONCLUSION	46
5.1	SCC - PREDICTIVE ABILITY FOR INFECTED AND UNINFECTED QUARTERS	47
5.2	INCIDENCE OF INFECTION	49
5.3	MILK YIELD AND COMPOSITION	51
5.4	SOMATIC CELLS	54
BIBLIOGRAPHY		58

LIST OF TABLES

	PAGE
Table 3.1 A simple chronological plan of the experiment	31
Table 4.1 Prevalence of infection within quarters and cows in two treatment groups at the beginning and end of the experiment	38
Table 4.2 Daily means for milk yield and composition and somatic cells in cows with high SCC or low SCC over a 4 week treatment period during which half of the cows of each group were milked once daily and the other half twice daily).	39
Table 4.3 Daily means for milk yield and composition and somatic cells in cows with high SCC or low SCC over a 2 week post-treatment period during which all cows were milked twice daily.	44

LIST OF FIGURES

		PAGE
Figure 4.1	The yield of cows with a high or low initial cell count during a four week period during which half the cows from each group were milked twice daily and the other half once daily, and during a 2 week post-treatment period when all cows were milked twice daily	40
	a. Milk	
	b. Fat	
	c. Protein	
	d. Lactose	
Figure 4.2	Somatic cell count of cows with high or low initial somatic cell count during a four week period during which half the cows from each group were milked twice daily and the other half once daily, and during a 2 week post-treatment period when all cows were milked twice daily	45

CHAPTER 1

CHAPTER ONE

1.1 INTRODUCTION

Somatic cell count (SCC) expresses the estimated total number of 'somatic' (body) cells present in one ml of milk. Mastitis infections are characterised by an elevation in the number of somatic cells in milk, which can be used as an indirect measure of infection (Nickerson and Heald, 1982; Holdaway, 1990). SCC is widely used for monitoring udder health in dairy herds. Also, in many countries, it is used as one criterion for milk payment to producers. Thus the degree of association between SCC and prevalence of mastitis is an important parameter.

Mastitis is inflammation of the udder mainly associated with bacterial infection (Dodd, 1971). On the basis of severity of inflammation of the mammary gland, two broad categories of mastitis are recognised: clinical mastitis where physical examination of the udder or the milk reveal abnormalities, and subclinical mastitis where mammary gland inflammation exists in the absence of visible signs. The subclinical form is detected by tests such as SCC applied to the milk to detect the effects of inflammation.

Research on SCC response to infection has resulted in the recommendation by the International Dairy Federation (IDF) of 500,000 cells/ml as a threshold value for mastitis diagnosis (Tolle, 1975). However, several workers report inaccuracies in diagnosis with the IDF definition, because infections are often associated with SCC below the threshold (Berning and Shook, 1992). Elevation of SCC can also occur in response to other factors related to the cow or management (Ward and Schulz, 1972). Moreover, threshold values for SCC tend to vary depending on whether there has been a low or high incidence of udder infection in the herd (Holdaway, 1990). Nevertheless, it is certain that intramammary infection will increase SCC. For this reason SCC is a useful parameter for the detection of subclinical mastitis.

Indirect methods which determine the SCC of milk samples such as the California Mastitis Test (CMT) and Wisconsin Mastitis Test (WMT) have been available for some time, as has the direct microscopic SCC procedure (Schalm *et al.*, 1971). More recently, automated devices for rapid determination of SCC in milk samples have become available. The two most commonly used are the Coulter Milk Cell Counter which counts particles as they flow through an electric field, and the Fossomatic, which stains cells with fluorescent dye and then counts the number of fluorescing particles. Both devices are capable of rapid, inexpensive determination of SCC in large numbers of samples (Heeschen, 1975). The ability to correctly interpret these SCC data, however, depends on an understanding of various factors which may affect them, plus the interaction between their effects.

1.2 ORGANISATION OF THE THESIS

This thesis consists of five chapters. Chapter One is an introductory chapter presenting highlights of the degree of association between SCC and udder infection.

Chapter Two contains a detailed review of literature relating to the importance of SCC and infection to the dairy industry; SCC interpretation; the origin of somatic cells, mechanism of their movement into the milk, and possible factors affecting their concentration in milk; effects of milking frequency on yield and composition of milk; and physiological explanations for milking frequency response. This chapter ends by presenting the objectives of the present study.

Experimental procedures and results are given in Chapters Three and Four respectively, discussion of the results, a general conclusion and suggestions for further investigation are presented in Chapter Five.