

# How to Control Somatic Cell Counts

A practical and easy to use guide to mastitis - No 1

By Peter Edmondson

## About the author



Peter Edmondson is a practising dairy vet who has been specialising in mastitis and milk quality work for the past 30 years. He qualified from Trinity College Dublin in Ireland in 1980. After five years in practice in Ireland, he joined Almaraj working with very large dairy herds in Saudi Arabia and China.

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Peter divides his time between veterinary practice and working for dairy, agri and pharmaceutical businesses throughout the world. He has excellent communication skills and is in demand to speak at international conferences. He is a very popular trainer of vets, farmers, technical and sales staff and is renowned for his practical and down to earth approach. He carries out referral visits across the world using his practical problem solving skills.

Peter is a Royal College of Veterinary Surgeons Registered Specialist in Cattle Health & Production and is a Diplomate of the European College of Bovine Herd Medicine. He has co-authored books and is a regular contributor to veterinary and farming press.

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## **About the Book**

This book gives a complete understanding of cell counts, the bacteria that cause them, how infection is spread and most importantly how they are controlled. It is filled with lots of practical advice and tips for farmers to achieve and maintain a low cell count herd.

## **About Context**

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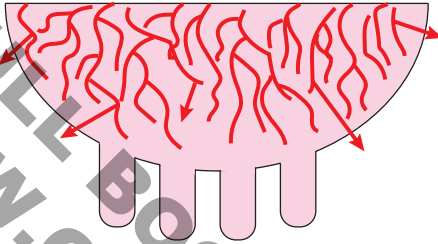
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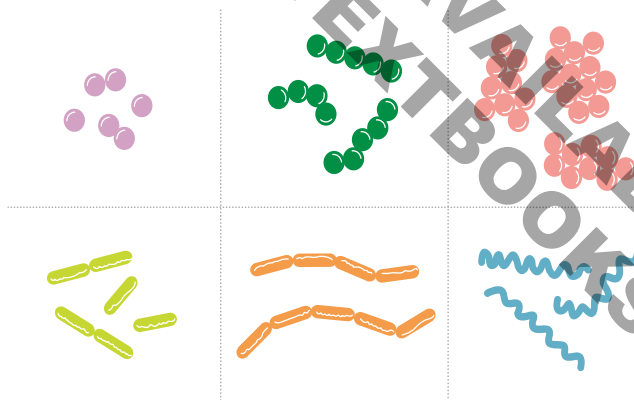
# The essentials of mastitis

## Introduction

Mastitis means inflammation of the mammary gland or udder, just like arthritis means inflammation of the joints. Mastitis comes from 'mastos' which is Greek for breast and 'itis' meaning inflammation.



Mastitis is caused by bacterial infections. Bacteria are everywhere. They can live in and on our bodies and the environment. Four bacteria make up the majority of mastitis in the cow. These bacteria can originate from inside the udder or from the environment and these are commonly referred to as **contagious** and **environmental** mastitis respectively.



There are six bacteria that can cause subclinical mastitis

Mastitis can cause **clinical** and **subclinical** mastitis. With clinical mastitis it is easy to see symptoms of the disease. With subclinical mastitis you still have the infection present but the cow shows no visible symptoms and this can only be detected using tests which are described later in this book.

Clinical mastitis is important as mastitis is a painful disease and there are welfare considerations for the cow. When a cow lies down with a swollen and inflamed udder, this will be very painful. You can't eliminate clinical mastitis completely as there will always be a risk of infection entering the udder from the environmental bacteria. However, the incidence can be greatly reduced through good management.

### FACTS

- Mastitis is caused by bacterial infections
- Four bacteria account for most mastitis
- Mastitis can be clinical or subclinical and contagious or environmental

### Did you know?

- **CONTAGIOUS** mastitis originates from inside the udder
- **ENVIRONMENTAL** mastitis originates from outside the animal
- **SUB CLINICAL** mastitis is where the cow has the disease, you just can't see any symptoms



## The essentials of mastitis

### White blood cells

Subclinical mastitis affects milk quality and there can be significant financial implications for farmers if they sell high cell count milk. This is discussed in detail later. With good management and by following the recommendations in this book you can reduce the levels of subclinical mastitis to low levels.



Tests need to be carried out to identify subclinical mastitis

#### FACT

- Somatic cells are mainly white blood cells trying to eliminate infection

**White blood cells** are responsible for fighting infection and in the udder these are called **somatic cells**. Somatic cells can be counted and the result is a somatic cell count or **SCC** for short.

There are specialist white blood cells called macrophages which are just floating around the udder trying to identify if any bacteria have invaded. If the macrophage comes across bacteria in the udder, they call for help and millions of white blood or somatic cells flood into the infected quarter. This response is very swift and millions of white blood cells can enter the udder in a matter of hours and will remain present as long as the infection remains. These white blood cells will try to engulf and destroy bacteria. It's like a policeman walking around a town or city. If the policeman comes across trouble, such as people fighting, then he calls for help and more policemen arrive. They remove those who were fighting, the disturbance is over and then the policeman can continue patrolling the town. This is like a case of clinical mastitis where the bacteria are eliminated completely.

However, it's not quite that simple as two different outcomes can occur depending on the types of infection. In the first situation, the white blood or somatic cells completely eliminate all bacteria. This is what can happen with clinical mastitis where all the infection has been eliminated and the udder returns to normal.

# The essentials of mastitis

## The man made disease of dairy cows!

Milkers handle lots of teats and the milking machine liners will be swapped from cow to cow and so the risk of spreading infection from cow to cow during milking is high.

We normally milk cows twice a day, occasionally three times. This means that unlike the suckler cow, we are not flushing out the milk and the bacteria in the udder regularly. This allows a build-up of bacteria between milkings. All of the above factors greatly increase the risk of mastitis, clinical and subclinical, occurring in the dairy cow.



As mastitis is a man made disease, we have to manage our way out of these problems. This is for the wellbeing of the cow and to ensure that the cows are both productive and profitable producing top quality milk.

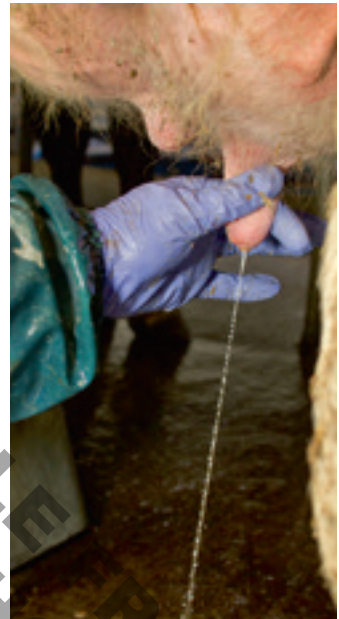
This is the first of a series of three books dealing with the practical control of mastitis. This book covers control of cell counts.

Mastitis Guide 2 will give a full understanding into the causes of clinical mastitis and focus on practical measures to reduce this disease. This guide will cover all the clinical mastitis bacteria, record-keeping and it's value in diagnosis of disease, environment and milking routine, the milking machine and mastitis, dry period infections and will provide top tips along with a couple of study herds.

Mastitis Guide 3 will deal with various other factors related to mastitis including Bactoscan and TBC, mastitis treatment, residue avoidance, robotic milking and parlour wash up routines. This book will highlight top tips and practical measures to maximise milk quality and minimise disease.

### FACTS

- Calves suckle cows 12–15 times per day
- Cows are usually milked twice a day



Milkers can spread mastitis from cow to cow

## Testing milk for cell counts

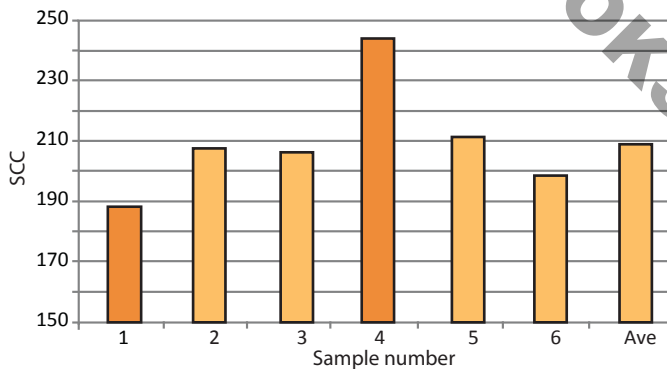
### Accuracy of testing

A bulk tank milk sample is collected every time milk is collected by the tanker driver. This can be tested for cell count, bacterial levels and antibiotic residues. Some tankers have an automated milk sample device that is fitted to the milk tanker. In other cases the sample is collected manually after the bulk tank has been thoroughly agitated for two minutes.

These bulk milk samples are kept in a refrigerated container from farm to the laboratory. A system of randomised sampling takes place for cell count and bacterial levels but each milk tanker is tested for antibiotic residues before it is unloaded at the milk factory.

The majority of cell count testing is carried out through automated machines and results in a numerical result that is accurate to within 5 to 10%. These machines can test up to 200 samples per hour. They test a control sample every 20 tests to ensure that the machines are working accurately. If the control sample test is outside of the expected results, the machine shuts down so that the problem can be corrected. Automated cell count testers work to extremely high standards of accuracy.

As shown below a bulk milk sample was collected and divided into six samples which were tested. The variation in the cell count results varied from 187 to 245 and the average was 210. This is another reason why dairy companies rely on three month payment averages to balance out these variations.



It is important that the milk from the bulk tank is properly mixed before any sample is collected. Modern bulk tanks are agitated every 15 minutes to help avoid separation of milk. If fat has separated and sits at the top of the bulk tank and a sample is collected, then the cell count and TBC or Bactoscan will be high, as will be the level of fat. Tanks should be agitated for at least 2 minutes before samples are collected.

#### FACT

- Cell count testing is accurate to  $\pm 5-10\%$



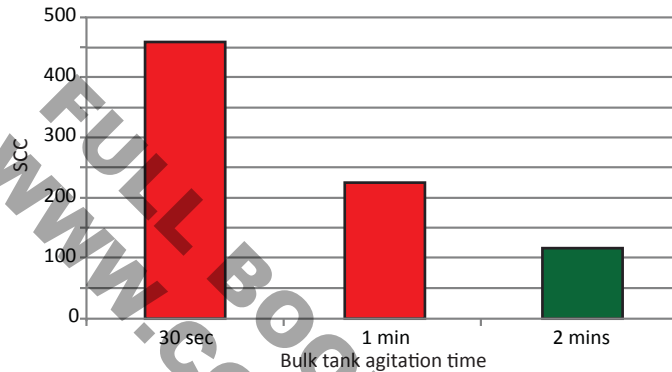
Samples kept refrigerated from farm to laboratory

#### WATCH OUT!

- Agitate the bulk tank for at least 2 minutes before sampling

## Testing milk for cell counts

### The importance of agitation



Three sets of milk samples were collected from a bulk tank where the fat had separated out and was sitting on the top of the milk. The tank was agitated and six samples were collected 30 seconds, and again one and two minutes after the start of agitation and the results were averaged out. The chart on the left shows that the cell count sample average collected after 30 seconds was artificially high at 441. When the bulk milk was properly mixed at two minutes, the results had reduced to 127.

Some milk tankers now collect a milk sample as the milk is being loaded into the tanker. This is intended to give a more representative sample of bulk milk as it is taken throughout collection.

There are also some portable machines like the Delaval DCC that can give a numerical result. Some farmers use this as a management tool for milk quality in their herd.

The California Mastitis Test (CMT) is a quick crude cow side test that gives an indication of cell count but does not give a numerical result. It is discussed later in this book. The CMT test is also called the paddle or MasTest.



Automated sampling by tanker



Cell count samples awaiting testing at milk quality testing lab



Delaval DCC cell counter



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