

# Bulletin

of the International Dairy Federation

---

---

448/  
2011

## SUGGESTED INTERPRETATION OF MASTITIS TERMINOLOGY

(revision of Bulletin of IDF N° 338/1999)



**VIEW THE UPCOMING IDF EVENTS AT:**

<http://www.fil-idf.org/EventsCalendar.htm>

## Bulletin of the International Dairy Federation 448/2011

© 2011, International Dairy Federation

### GENERAL TERMS AND CONDITIONS FOR USING THIS ELECTRONIC PUBLICATION

#### **Introduction**

Use of the material provided in this publication is subject to the Terms and Conditions in this document. These Terms and Conditions are designed to make it clear to users of this material what they may and may not do with the content provided to them. Our aim has been to make the Terms and Conditions unambiguous and fair to all parties, but if further explanation is required, please send an e-mail to [info@fil-idf.org](mailto:info@fil-idf.org) with your question.

#### **Permitted Use**

The User may make unlimited use of the Content, including searching, displaying, viewing on-screen and printing for the purposes of research, teaching or private study but not for commercial use.

#### **Copyright**

Site layout, design, images, programs, text and other information (collectively, the "Content") is the property of the International Dairy Federation and is protected by copyright and other intellectual property laws. Users may not copy, display, distribute, modify, publish, reproduce, store, transmit, create derivative works from, or sell or license all or any part of the content obtained from this publication. Copyright notices must not be modified or removed from any Content obtained under the terms of this licence.

Any questions about whether a particular use is authorized and any requests for permission to publish, reproduce, distribute, display or make derivative works from any Content should be directed to [info@fil-idf.org](mailto:info@fil-idf.org)

#### **Availability**

Although the International Dairy Federation publications are developed in view of maximum user-friendliness, the International Dairy Federation cannot guarantee any of these products to work on or with any particular computer system.

#### **Liability**

Although the International Dairy Federation has taken reasonable care to ensure that the information, data and other material made available in its publication is error-free and up-to-date, it accepts no responsibility for corruption to the information, data and other material thereafter, including but not limited to any defects caused by the transmission or processing of the information, data and other material. The information made available in this publication, has been obtained from or is based upon sources believed by the International Dairy Federation to be reliable but is not guaranteed as to accuracy or completeness. The information is supplied without obligation and on the understanding that any person who acts upon it or otherwise changes his/her position in reliance thereon does so entirely at his/her own risk.

Send any comments or inquiries to:  
International Dairy Federation (I.N.P.A.)  
Boulevard Auguste Reyers 70/B  
1030 Brussels  
Belgium  
Phone: + 32 2 733 98 88  
Fax: + 32 2 733 04 13  
E-mail: [info@fil-idf.org](mailto:info@fil-idf.org)  
Web: [www.fil-idf.org](http://www.fil-idf.org)

# Bulletin of the International Dairy Federation

PRICE : 40 Euro

448/2011

## CONTENTS

### SUGGESTED INTERPRETATION OF MASTITIS TERMINOLOGY (revision of Bulletin of IDF N° 338/1999)

<b>Foreword</b>	<b>1</b>	
<b>Introduction</b>	<b>2</b>	
<b>List of Terms and Interpretations</b>	<b>3</b>	



Subscription Price for the electronic version of the 2011 Bulletin : 335 Euro for all issues.

Address orders to :

INTERNATIONAL DAIRY FEDERATION / FEDERATION INTERNATIONALE DU LAIT

Boulevard Auguste Reyers, 70/B - 1030 Brussels (Belgium)

Telephone : +32 2 733 98 88 - Telefax : +32 2 733 04 13 - E-mail : [info@fil-idf.org](mailto:info@fil-idf.org) - <http://www.fil-idf.org>

# SUGGESTED INTERPRETATION OF MASTITIS TERMINOLOGY (revision of Bulletin of IDF N° 338/1999)

## Foreword

New work on the revision of Bulletin of IDF N° 338/1999 was approved in 2007.

A Project Group was established to undertake the task under the auspices of IDF Standing Committee on Animal Health, within the scope of the Action team on Mastitis. The work was launched in April 2008. The members of the Project Group were invited to comment on the existing mastitis terminology texts in Bull of IDF N° 338/1999 and N° 394/2005, together with a collection of new terms gathered from recent papers in the scientific literature. A complete text of the revision of Bull N° 338/1999 was issued to IDF National Committees for approval with Questionnaire 0909 SCAH. The NCs commented extensively and quite critically. The project Group reviewed the comments and agreed to the changes needed to accommodate them, though not all comments were accepted. The final draft was submitted to the SC on Animal Health for approval in late 2010.

IDF wishes to thank the members of the Project Group for their efforts and the successful accomplishment of the revision of this important glossary:

Edward Hopkin - leader of the Project Group (Honorary Member of IDF), Elizabeth Berry (GB), Christian Burvenich (BE), Shahriar Dabirian (IR), Jörn Hamann (DE), Karin Knappstein (DE), Eric Hillerton (NZ), Joe Hogan (US), Henk Hogeveen (NL), Yiseok Joo (KR), Daniel Scholl (CA), Liv Sølvørød (NO), Vincent Turner (ZA), Anne Cathrine Whist (NO), Alfonso Zecconi (IT).

Christian Robert,  
Director General of IDF

Brussels, March 2011

## Introduction

Mastitis is a painful disease in dairy animals of great importance in animal welfare and in the economics of milk production. However the development of knowledge has been accompanied by a diversity of terms in the field and differences in usage. Bulletin of IDF N° 338/1999, drawn up by K L Smith (USA), then Chair of the IDF Group of Experts on Mastitis (Group A2), provided an invaluable guide to the correct usage of mastitis terms. In subsequent years research in mastitis made significant progress and in assessing the economic consequences for the dairy sector of the disease in dairy animals. New terms appeared in the scientific literature and IDF agreed to prepare a revision of Bulletin 338/1999 involving an examination of the literature since the earlier publication, notably Bulletin of IDF N° 394/2005, new terms gathered from recent papers in the scientific literature and work in hand in IDF and elsewhere. The objective was to ensure that usage of terms in mastitis work is unambiguous, bearing in mind the importance of the disease for the dairy sector.

The Project Groups has been very largely successful in its task although it must be recognized that some terms relating to somatic cell counts still need further clarification. Work has started in a new Project Group under the auspices of IDF's SC on Animal Health on use of somatic cell count data and it is to be hoped that this will also help provide the necessary precision in describing these concepts.

Edward Hopkin  
Leader of the Project Group

## SUGGESTED INTERPRETATION OF MASTITIS TERMINOLOGY (revision of Bulletin of IDF N° 338/1999)

### LIST OF TERMS AND INTERPRETATIONS

*All terms in this list are interpreted in the specific context of mastitis.  
Interpretations may not be valid in other contexts.*

abnormal milk	Compare <b>normal milk</b> .
abreast parlor	Milking parlor in which animals stand side by side in stalls which have a gate at the front and a chain at the rear. It is usual for the animal standing to be higher than the main floor. A fixed version of a bail.
abscess	Encapsulated, localized collection of pus or infection in the tissue of the body, often accompanied by swelling and inflammation and frequently caused by bacteria.
accessory gene regulator; AGR	In bacteria a metabolic system that regulates the expression of virulence of associated genes of specific pathogens.
ACR	See <b>automatic cluster remover</b> .
active antibacterial ingredient	Antibacterial compound that is capable of killing or inhibiting the growth of bacteria.
acute clinical mastitis	Preferred term <b>severe clinical mastitis</b> .
aerobic environment	Environment with oxygen.
aerobic bacteria	Bacteria that require oxygen for growth.
aerophile	Organism that likes or tolerates oxygen.
aesculin (UK)	See <b>esculin</b> .
aesculin blood agar (UK)	See <b>esculin blood agar</b> .
aetiology(UK)	See <b>etiology</b> .
air bleed, air admission hole, air vent	Calibrated aperture which allows admission of air.
air flow meter	Instrument used to measure the air flow in a vacuum system.
air tube	Tube or hose which conveys air between the shell and liner to the pulsator.
albumin	Any of a class of simple, sulfur-containing, water-soluble proteins that coagulate when heated, occurring in blood, colostrum, milk, egg white and other body tissue.
alleyway	Space in the barn where the animals walk from one location to another.
alpha-hemolysin (US); alpha-haemolysin (UK)	Protein secreted by most <i>Staphylococcus aureus</i> during growth in culture that causes blood vessel constriction, blood clotting and complete lysis of red blood cells around colonies growing on blood agar. Some streptococcal species produce a hemolysin that causes the greenish discoloration of erythrocytes referred to as alpha-hemolysis.
alpha-hemolysis (US), alpha-haemolysis (UK);	Zone of greenish, discolored erythrocytes surrounding colonies of some streptococcal species growing on blood agar. The word is also jargon adopted by mastitis diagnosticians to describe complete or clear hemolysis of red blood cells (due to alpha-hemolysin) around colonies of some <i>Staphylococcus</i> species growing on blood. Compare <b>beta-hemolysis</b> .

alpha-lactalbumin	One of the major whey proteins secreted by the mammary gland. It is the "B" protein of the lactose synthetase enzyme complex responsible for the synthesis of lactose.
alpha-toxin	See <b>alpha-hemolysin</b> (preferred term).
alternate pulsation	pulsation where the movement of two liners within a cluster alternates with the movement of the other two liners or, in a cluster with only two teatcups, for example for sheep or goats, cyclic movement of one liner alternating with the movement of the other liner
alveolar milk	Milk within the mammary gland alveoli that can only be released by the action of the hormone oxytocin. Compare <b>cisternal milk</b> and <b>strict foremilk</b> .
alveolus	Microscopic, spherically shaped, milk-producing unit of the udder that is composed of a single layer of secretory epithelial cells. Many millions of alveoli, grouped into lobules and lobes, make up the secretory tissue of the mammary gland.
AMS	See <b>automated milking system</b> .
anaerobic bacteria	Bacteria that do not require oxygen for growth.
anaerobic environment	Environment without oxygen.
anterior pituitary	Small endocrine gland at the base of the brain that secretes hormones essential to the regulation of reproductive and lactational physiology.
antibiotic	Antimicrobial substance, such as penicillin or streptomycin, produced by or derived from certain fungi, bacteria, or other organism, that can destroy or inhibit the growth of other microorganisms. Antibiotics are widely used in the treatment and prevention of infections that cause bovine mastitis.
antimicrobial resistance	Condition in which bacteria are not affected by the presence of certain antimicrobials or are not susceptible to certain antimicrobials.
antibiotic susceptibility	Vulnerability of a bacterial strain to treatment with an antibiotic.
antibody	Proteins synthesized by the animals' immune system in response to the presence of antigens (foreign substances). Antibodies bind specifically to the antigen and aid in the elimination of the antigen. Compare <b>immunoglobulin</b> .
antigen	Foreign body (e.g. bacteria or viruses) or substance that results in the production of antibodies by the host.
anti-inflammatory drug	Chemical (drug) used to suppress one or more of the signs associated with the inflammatory process. Such drugs are generally classed as steroidal or non-steroidal.
antimicrobial	Chemical agent that will kill or inhibit the growth of a microorganism.
antisepsis	Destruction of bacteria or inhibition of growth of bacteria.
antiseptic	A chemical that produces antisepsis.
apoptosis	Death of cells regulated by an intracellular programme (PCD = programmed cell death), in contrast to <i>necrosis</i> , death resulting from acute tissue impairment.
<i>Arcanobacterium pyogenes</i>	Bacterium that is a Gram-positive, catalase negative microaerophilic, club-shaped rod involved in the summer mastitis complex. Formerly called <i>Corynebacterium pyogenes</i> and <i>Actinomyces pyogenes</i> .
arithmetic mean	Measure of central tendency computed by adding all the individual values together and dividing by the number in the group.
arachidonic acid	Essential fatty acid, C <sub>20</sub> H <sub>32</sub> O <sub>2</sub> , found in the lipids of most tissues and particularly cell membranes, that is the precursor in the synthesis of prostaglandins, prostacyclins, leukotrienes, and other related effectors.

arachidonic acid metabolite	Any of the products of the metabolism of arachidonic acid such as the prostaglandins, prostacyclins, and leukotrienes.
aseptic sampling	Collection of milk samples into a sterile container using extreme care to prevent contamination from the animal, the environment, or the samplers hands. Asepsis (complete absence of microorganisms) cannot be guaranteed.
ATO	See <b>automatic take-off</b> .
automatic milking installation; AMI; automated milking system; AMS	Automatic milking machine and milk cooling and storage system.
automatic milking machine; AMM; robotic milker; milk robot	Milking machine for unattended milking of identified animals.
automatic cluster remover; ACR; automatic take-off; ATO; automatic detacher	Device that without human intervention removes all teatcups of the cluster after shutting off the milking vacuum to all teatcups.
automatic detacher	See <b>automatic cluster remover</b> .
automatic identification	Automated electronic system for cow identification, primarily used in milking parlours and feeders. Transponders are attached to the individual animals generally in the form of a neck collar.
automatic take-off	See <b>automatic cluster remover</b> .
auto-tandem	See <b>tandem parlor</b> .
backflush / backflushing	Automated system for rinsing or sanitizing teat cup liners between animals during the milking of a herd.
Bacteremia (US); bacter-aemia (UK)	Presence of bacteria in blood.
bacteria	Any of the unicellular, prokaryotic microorganisms of the class Schizomycetes, which vary in terms of morphology, oxygen and nutritional requirements and motility, and may be free-living, saprophytic, or pathogenic, the latter causing disease in plants or animals.
bacteriological cure	To restore the infected mammary gland to its uninfected state either following therapy or as a result of the cow mounting a successful immune response.
Bactocount	Electronic instrument used to automate the determination of bacterial numbers in milk samples. The instrument counts individual bacterial cells, both dead and viable, rather than colony forming units. (Bentley Instruments, Chaska, MN, USA.) Note. This instrument is commonly used in various countries. Its mention here does not imply that the IDF only recognizes or recommends this specific instrument. Other brand-named instruments are available and used on a worldwide basis.
Bactoscan	Electronic instrument used to automate the determination of bacterial numbers in milk samples. The instrument counts individual bacterial cells, both dead and viable, rather than colony forming units. (Foss Electric, Hillerød, Denmark.) Note. This instrument is commonly used in various countries. Its mention here does not imply that the IDF only recognizes or recommends this specific instrument. Other brand-named instruments are available and used on a worldwide basis.
bail	Place to confine animals for milking. A frame for holding an animal's head during milking (Australia).



barrier teat dip	Product formulated with a component that forms a physical barrier on the outside of the teat to protect the teat from contamination between milkings or in the dry period.
bedding	Material used to aid in comfort and cleanliness when the animals are lying down. Material may be organic (e.g. straw, sawdust, or recycled manure) or inorganic (sand).
beta-hemolysis (US); beta-haemolysis (UK)	Clear zone of lysed erythrocytes surrounding colonies of some streptococcal species growing on blood agar. The word is also jargon adopted by mastitis diagnosticians to describe a zone of incomplete or partial hemolysis of red blood cells (due to beta-hemolysin) surrounding colonies of <i>Staphylococcus aureus</i> growing on blood agar. Compare <b>alpha-hemolysis</b> .
beta-hemolysin (US); beta-haemolysin (UK)	Protein released by <i>Staphylococcus aureus</i> that causes partial or incomplete hemolysis of red blood cells. Some streptococcal species produce a hemolysin that causes complete lysis of red cells referred to as beta-hemolysis.
beta-hemolytic staph	Jargon frequently used to describe <i>Staphylococcus aureus</i> that produce beta toxin and a zone of incomplete hemolysis when grown on blood agar.
beta-lactoglobulin	Major whey protein of bovine milk accounting for approximately 50% of the whey proteins in normal milk.
beta-toxin	See <i>beta-hemolysis</i> (preferred term).
blanket dry cow therapy (preferred); total dry animal therapy	Treating with antibiotics all mammary quarters of all animals in a dairy herd at the completion of each lactation. Compare <b>selective dry cow therapy</b> .
biofilm	Structured community of bacterial cells enclosed in a self-produced polymeric matrix and adherent to an inert or living surface.
biofilm resister cell	One form of resistant cell present in biofilms in which the resistance is due to physiological changes associated with the biofilm mode of growth.
biomarker	Specific biochemical substance in the body which has a particular molecular feature which makes it useful for measurement of, for example, the progress of disease or the effects of treatment.
biosecurity	Measures taken to prevent introduction of disease to, and limit the spread of disease on, the farm.
blood agar	Solid bacteriological growth medium used for the primary culture of milk samples intended for the purpose of diagnosis of intramammary infection.
serum albumin; blood serum albumin; BSA	Major protein of blood serum that also occurs in low concentration in normal mammary secretions including milk. The concentration in milk increases during inflammation and is sometimes used as a marker for inflammation / mastitis of the mammary gland.
BMSCC	See <b>bulk milk somatic cell count</b> .
box stall; calving box	Large enclosed stall for a single animal. Often used as a place where animals give birth (calving box).
BSA	See <b>bovine serum albumin</b> .
broth culture	Suspension of bacteria or microorganisms grown in a liquid medium.
BTSCC	See <b>bulk tank somatic cell count</b> .
buiatrics	All scientific and practical knowledge on the management and production of cattle and the control of cattle diseases.
bucket milking machine	Milking machine in which milk flows from one or two clusters into a portable milk-receiving bucket, connected to the vacuum system.

bulk milk	Co-mingled milk produced by all the animals in a herd or the co-mingled milk produced by several herds.
bulk milk somatic cell count; BMSCC	Somatic cell count of milk in a collection vessel produced by all animals in a dairy herd contributing to the bulk milk in one or more milkings. It represents the weighted average of all animals in the herd and is a measure of the quality of the milk sold. Compare <b>bulk tank somatic cell count</b> .
bulk tank	Large storage tank for milk, generally for cooling it at cold temperature. Compare <b>refrigerated bulk milk tank</b> .
bulk tank milk	Milk from a bulk tank.
bulk tank milk culture	Qualitative test to estimate the number of specific types of bacteria present in the bulk tank milk that is also used as a semi-quantitative test. The test is used by veterinary practitioners and some milk procurement agencies as a means to determine milk quality and to help in solving mastitis and milk quality problems on dairy farms. The test is not standardized and varies among laboratories that conduct the test.
bulk tank somatic cell count: BTSCC	Somatic cell count of a consignment of milk obtained from a single bulk tank. Frequently, but not always, it is the same as <b>bulk milk somatic cell count</b> . Compare <b>herd cell count</b> .
California Mastitis Test; CMT	Indirect measure of somatic cell concentration in milk. The test is based on detergent interaction with DNA of somatic cells found in milk.
calving	Process of a cow or buffalo giving birth.
calving box	See <b>box stall</b> .
CAMP Test	Bacterial test used to identify <i>Streptococcus agalactiae</i> and named after the inventors Christie, Atkins, and Munch-Petersen.
cannula	Metal or plastic tube for insertion into the body through a natural opening to draw off fluid or to introduce medication.
carbohydrate	Natural compound made up of carbon, hydrogen and oxygen. Sugars and starches are examples of carbohydrates. The primary carbohydrate in milk is lactose.
carcinogen	Agent that causes cancer.
case control study	Study that starts with the identification of animals (or herds) with the disease of interest and a suitable control (comparison, reference) group of animals (or herds) without the disease. This type of study involves collection and analysis of data on disease determinants in the two groups. Usually, it is a retrospective study because disease events have occurred before the exposure history is determined.
casein	Major protein class found in milk. Casein in milk exists in the form of complexes called micelles. The types of casein molecules found in milk are $\alpha$ s-casein, $\beta$ -casein, $\kappa$ -casein, and $\gamma$ -casein.
case of clinical mastitis	Incident of clinical mastitis in one or more quarters at any one time. A new case can only be declared after a designated period of time since the last signs of clinical mastitis or the pathogen responsible for the clinical event changes. Eight days has been recommended in: Recommendations for Presentation of Mastitis-Related Data; IDF Bulletin No 321/1997. A new case does not necessarily signify a new intra-mammary infection.
cell membrane receptor	Specific binding site for biochemical messages on the cell membrane. Initiates a specific cell function after binding the message. Can be identified with markers and can be used to differentiate cell populations.
CFM	See <b>cubic feet per minute</b>

challenge study; challenge trial	Mastitis trial in which teats are either exposed to high numbers of bacteria generally by dipping teats in broth cultures or infusing the bacteria into the teat cistern using a cannula inserted through the streak canal. The intent is to increase the rate of new infection. Compare <b>natural exposure trial</b> .
chlorhexidine	Chlorine compound, 1, 6-di-(4-chlorophenyldiguanido) hexane, used as a germicidal agent in some teat disinfectants.
chronic	Disease having long duration.
chronic mastitis	Udder inflammation that continues over a long period of time. Chronic mastitis can be clinical or subclinical.
churn	1. ( <i>noun</i> ) A container or equipment in which cream or milk is agitated to make butter. 2. ( <i>noun</i> ) A large milk can in Great Britain. 3. ( <i>verb</i> ) To make butter by the agitation of cream. 4. ( <i>verb</i> ) To shake or agitate with violence or continued motion.
cisternal milk	Milk that accumulates in the gland cistern between milkings. Compare <b>alveolar milk</b> and <b>strict foremilk</b>
CIP	See <b>cleaning-in-place</b> .
claw	Manifold that spaces the teatcups in a cluster. Device to which the teatcups are attached through the short milk tube and which connects them to the long milk tube and long pulse tube.
claw vacuum	Vacuum within the claw for specified conditions of liquid and air flowrate.
cleaning-in-place; CIP	System for cleaning and disinfecting the milk and /or cooling system without disassembly.
clinical	Apparent on examination by the animal handler or veterinarian.
clinical cure	To restore the clinical mammary gland to its non-clinical state following therapy or as a result of the animal resolving clinical symptoms. The clinical cure may occur with or without a bacteriological cure.
clinical cure rate	Proportion of clinical animals or quarters that revert to a normal state over a specified period of time. Generally used in conjunction with therapy but not limited to therapy.
clinical mastitis; CM	Udder inflammation characterized by visible abnormalities in the milk and or udder. Severity of clinical cases should be described as mild, moderate, or severe.
clot	Semi-solid mass of leukocytes and/or milk proteins that forms during the inflammatory process in mammary glands. The presence of clots in milk is an indicator of clinical mastitis. Compare <b>flake</b> .
cluster	Assembly to milk one animal consisting of teatcups and may include a claw or connectors between long and short milk tubes and long and short pulse tubes.
CM	See <b>clinical mastitis</b> .
CMS	See <b>composite milk sample</b> .
CMSCC	See <b>composite milk somatic cell count</b> .
CMT	See <b>California Mastitis Test</b> .
CNS	See <b>coagulase negative staphylococci</b> .
coagulase negative staphylococci; CNS	Several species of staphylococci that do not produce the enzyme coagulase. Many species are normal skin flora and can infect the mammary gland generally causing inflammation of mild or moderate severity in the bovine. They are a major cause of intramammary infection in heifers and in animals at first calving, during the dry period in cows, and in sheep and goats.

coagulase test	Biochemical test used to differentiate <i>Staphylococcus aureus</i> from species of staphylococci that do not produce coagulase. A positive test is the coagulation of mammalian plasma (generally rabbit). The test can be conducted as a tube test or a slide test. The slide test detects bound coagulase and the tube test detects free coagulase. The tube test is recommended.
coliform	Gram-negative, lactose fermenting, rod shaped bacteria originating from the intestinal tract and capable of causing disease when introduced into other sites in the body such as the mammary gland. They do not require, but can use, oxygen and they do not form spores. They produce acid and gas from the fermentation of lactose. Important genera and species causing bovine mastitis are <i>Escherichia coli</i> , <i>Klebsiella pneumoniae</i> , and <i>Enterobacter aerogenes</i> .
colonization	Attachment to and growth of a microorganism on teat skin, the streak canal, or mammary ducts and secretory tissue. Examples for mastitis pathogens that colonize mammary glands include <i>Staphylococcus aureus</i> and <i>Streptococcus agalactiae</i> .
colostrogenesis	Initiation of colostrum formation under the influence of hormones. The process starts prior to parturition and ends soon after parturition. A key feature is the active transport of the immunoglobulin IgG1 from blood serum to mammary secretion. Compare <b>lactogenesis</b> .
colostrum	Yellowish liquid, especially rich in immunoglobulins (antibodies), secreted by the mammary gland a few days before and a few days after parturition. The composition and texture of colostrum differs significantly from milk. Colostrum is essential for passive immunization of the newborn animal.
combination therapy	Therapy involving two or more drugs or two or more routes of drug administration, e.g. intramammary plus parenteral, intramuscular or intravenous.
comfort stall	See <b>tie stall</b> .
comfort stall barn; tie barn stall	Barn for housing animals in comfort stalls.
co-mingled milk	Mixing of milk from multiple glands, animals, or herds.
complement	Group of proteins found in blood and partially in milk which act both in host defense against microorganisms and in the inflammatory process.
complementary milk	See <b>residual milk</b> .
composite milk	Co-mingled milk from all functional mammary glands (quarters) of a cow or buffalo or all functional mammary glands (halves) of a doe or ewe. The term generally implies that the glands (udder) have been milked to completion.
composite milk sample; CMS	Sample of milk obtained from the co-mingled milk of all functional mammary glands of a cow, buffalo, doe, or ewe. May be referred to as a cow, buffalo, doe, or ewe milk sample.
composite milk somatic cell count; CMSCC	Somatic cell count conducted on composite milk.
conductivity	Measure of the ability of milk to conduct electric current. Used as an indicator of inflammation / mastitis of the mammary gland.
congestion	Intravascular accumulation of blood. Congestion may occur in animals' teats as a result of machine milking and is due mainly to the milking vacuum. Clinical mastitis sometimes results in quarter congestion.
contagious pathogen	Pathogens that cause or induce a transmissible disease by direct or indirect contact.
contagious mastitis	Mastitis that is caused by a contagious pathogen such as <i>Staphylococcus aureus</i> , <i>Streptococcus agalactiae</i> and <i>Corynebacterium bovis</i> . The transmission of contagious mastitis is primarily from infected mammary gland to uninfected mammary gland and transmission occurs primarily during the milking process.

contaminated milk sample	Milk sample taken for microbiological culture that results in the growth of 3 or more colony types and complicates or makes impossible the diagnosis of an intramammary infection. Contamination is generally at one of two levels: multiple colony types with heavy growth which makes diagnosis impossible; or 1 to 3 dissimilar colonies that may occur alone on the plate or among the colonies of an otherwise pure culture.
controller	See <b>vacuum regulator</b> .
corral	Fenced area used to contain animals, usually cattle or horses. The term is most often used to describe a system of dairy cattle containment in the western part of the United States.
corticosteroid	Hormone that has anti-inflammatory activity produced by the adrenal gland. It is also available in synthetic versions and can cause immuno-depression.
cost/benefit analysis	Methods of identifying the losses and gains in monetary terms of the effects of a disease, or the control thereof, that are incurred by society as a whole.
Coulter Counter	Electronic instrument used to count milk somatic cells. The machine counts particles of a predetermined size. No longer acceptable by most regulatory agencies.
country level	Level of decision in response to mastitis where a whole country is taken into consideration, a typical decision of general use in diagnostic procedure, culling policy, treatment policy or the building up of a protective programme.
cow (composite) milk somatic cell count; CMSCC	See <b>composite milk somatic cell count</b> .
cow level	Level of decision in response to mastitis in which only the complete cow is taken into consideration, a typical decision on therapy, culling or nothing to be done.
creeping teat cup	Movement of the teatcup up the length of the teat as milking progresses. Such movement can close off the top of the teat and prevent milk from entering the teat cistern from the gland cistern. The situation is generally considered to be undesirable.
cricoid ring	Folds of tissue that form the boundary between the teat cistern and the gland cistern. Compare <b>Fürstenberg's rosette</b> .
cryoscope	Device for measuring the freezing point of a liquid, in particular milk.
cubic feet per minute; CFM	Unit of air flow in a vacuum system ( <i>measuring system used in the USA</i> ). 1CFM=2.8 l/min
cubicle; free stall	Type of stall used in some housing systems. Animals are free to use the stalls for resting either standing or lying down and may at any time exit the stall. The term "cubicle" is used primarily in Europe and is synonymous with <b>free stall</b> in North America.
cubicle barn; cubicle house; free stall barn	Barn for housing cattle where the resting areas for the animals are cubicles. The term is used primarily in Europe and is synonymous with <b>free stall barn</b> in North America.
cull	1. ( <i>noun</i> ) Animal identified as inferior due to production, disease, or injury and as a result to be removed from the herd. 2. ( <i>verb</i> ) To remove from the herd a cow identified as inferior due to production, disease, or injury. The term cull does not necessarily imply killing of the animal.
culling	Act of removing animals from a dairy herd, generally because the animals are inferior production units, sick, or diseased. The decision being based on criteria, typically mastitis
culture	Cultivation of microorganisms for diagnosis of infection, determination of quality and contamination, and for other technological reasons.

cure	To restore to health, soundness or normality.
cure rate	Proportion of infected mammary quarters that become uninfected following therapy, or over a specified period of time, or following an event such as drying off.
Cutimeter	Spring loaded caliper instrument known as Cutimeter (No 33865, Hauptner, Solingen, Germany) was modified to be used as an instrument to measure teat thickness changes. Compare <b>teat thickness</b> . Note. This instrument is commonly used in various countries. Its mention here does not imply that the IDF only recognizes or recommends this specific instrument. Other brand-named instruments are available and used on a worldwide basis.
cyanotic teats	Teats colored blue due to inadequate circulation of venous blood. Central cyanosis can cause peripheral signs.
cytokine	Protein produced by leukocytes for communication within the immune system including regulation of the antibacterial activity of other leukocytes and the inflammatory response of the host.
cumulative incidence	See <b>incidence risk</b> .
Dairy Herd Improvement Association; DHIA	Major milk recording organization in the United States.
days in milk; DIM	Number of calendar days an animal has been producing milk since the day she last calved.
DCT	See <b>dry cow therapy</b> .
delivery line	Pipeline in which milk flows under positive pressure from a releaser or releaser milk pump to a collecting or storage vessel.
deoxyribonucleic acid	See <b>DNA</b> .
DHIA	See <b>Dairy Herd Improvement Association</b> .
diapedesis	Movement or passage of blood cells, especially white blood cells, through intact capillary walls into the cistern and milk conveying system of the udder.
DIM	See <b>days in milk</b> .
direct microscopic somatic cell count; DMSCC	Quantitative method of counting the number of cells present in a given quantity of milk based on spreading a precise quantity of milk over a specified area of a microscopic slide, drying the milk film, staining and counting the number of cells under a microscope. The quantitative method on which all other quantitative methods are based.
disaccharide	Carbohydrate made up of two linked sugar molecules. An example is lactose, the major sugar of milk.
discarded milk	Milk that is prohibited from entering the food chain owing to the presence of unacceptable concentrations of drugs, abnormalities due to clinical mastitis, blood or colostrum.
discard time	Amount of time following parturition or the last administration of a drug until the milk can legally enter the human food chain. Analogous to <b>withholding time</b> in some countries.
discharged milk	Milk that has been produced from the udder and secreted via the teat canal
disease	Disordered or incorrectly functioning organ, part, structure, or system of the body resulting from the effect of genetic or developmental errors, infection, poisons, nutritional deficiency or imbalance, toxicity, or unfavorable environmental factors.
disinfect	To destroy microorganisms.

disinfectant; germicide	Any chemical agent used to destroy or inhibit the growth of microorganisms.
distribution tank	Air vessel or chamber which acts as a manifold for other pipelines, vacuum pump and the sanitary trap, or interceptor.
DMSCC	See <b>direct microscopic somatic cell count</b> .
DNA	Abbreviation for deoxyribonucleic acid. Macromolecules contained in the nucleus of all cells of the body and carries the genetic code that determines all the characteristics of the organism or animal.
DNA fingerprinting	Method of identification of mastitis pathogens based upon genetic similarities or differences associated with DNA.
doe	Mature female goat.
droplet impact	Microscopic droplets of milk, possibly containing microorganisms, that may impact against the teat orifice near the end of milking and may initiate a new udder infection.
drug efficacy	Proportion of treated quarters that are cured minus the proportion of untreated (control) quarters that are cured.
dry cow	Non-lactating cow.
dry cow prophylaxis	Administration of antibiotics following the last milking of the lactation in an effort to prevent new infections from occurring early in the dry period. External or internal teat sealants may also be used either alone or in conjunction with antibiotics.
dry cow therapy; DCT	The administration of antibiotics following the last milking of the lactation in an effort to cure infected quarters and prevent new infections from occurring. The antibiotics are generally administered by intramammary infusion but may also be injected systemically. External or internal teat sealants may also be used for prevention, either alone or in conjunction with antibiotics.
dry quarter	Non-lactating mammary gland that has ceased to function during the lactation.
drying off	Process of ending the lactation, the transition of the mammary gland from a lactating state to non-lactating state. Often used to describe the last milking of a lactation and the administration of dry cow therapy. Compare <b>involution</b> .
dry lot	A term for a type of animal housing involving corrals in the western part of the United States. The term is also used to describe a collection of non-lactating (dry) animals.
dry period	Period of time between the last milking of one lactation and the first milking of the next lactation following calving.
dump bucket	Container or vessel used to collect non-saleable milk from an animal.
duration of infection	Length of time an infection is present in the mammary gland.
early lactation	Period of time from calving to 100 days of lactation. Compare <b>lactation</b> .
EBA	See <b>esculin blood agar</b> .
edema (US); oedema (UK)	Accumulation of protein-poor interstitial fluid between cells or tissues due to an imbalance between filtration and resorption capacity of the vascular bed without a change in vascular permeability. The result is swelling of the tissue. Gravity is a predisposing factor for the occurrence of edema. Compare <b>inflammatory edema</b> .
effective reserve	Reserve pump capacity measured as the airflow that can be admitted at or near the receiver in pipeline milking machines, at or near the sanitary trap in recorder machines, or into the airline in bucket machines, to decrease the vacuum by 2 kPa (0.6 in Hg) with all units connected and operating with teatcups plugged.

ELISA s/p ratio; enzyme-linked immunoabsorbent assay	Enzyme based method for detecting the presence of antigen or antibody, applied to serum or milk.
emollient	Compound used to soften or condition teat skin. Common emollients added to teat dips are lanolin and glycerine.
emulsion	Suspension of one liquid in another. Milk is an emulsion of fat droplets in an aqueous medium.
endemic disease	The constant presence of a disease or infectious agent within a given geographic area or population group. It also implies a prevalence which is usual in the area or in the population.
endotoxemia (US); endotoxaemia (UK)	Presence of endotoxin in the blood stream.
endotoxin	Toxic material that is part of the cell wall of Gram negative bacteria and is released upon death of the bacterial cell.
energy-corrected milk	Milk of defined fat and protein content specified for purposes of comparison between different samples of milk from a variety of sources.
<i>Enterobacter</i> spp.	Gram-negative, rod shaped coliform bacteria. Isolates are lactose positive, citrate positive and motile.
enterococci	Gram-positive, catalase-negative, salt tolerant cocci originating from the intestinal tract.
<i>Enterococcus faecalis</i>	Gram-positive, catalase negative, esculin positive, CAMP negative spherical shaped bacteria that will grow in the presence of 6.5% NaCl. Are considered to be environmental pathogens.
<i>Enterococcus faecium</i>	Gram-positive, catalase-negative, esculin positive, CAMP negative spherical shaped bacteria that will grow in the presence of 6.5% NaCl re considered to be environmental pathogens.
enterotoxin	Toxin secreted by bacteria that specifically damages cells in the intestinal tract (an example is <i>Staphylococcus aureus</i> toxin).
environmental mastitis	Mastitis caused by environmental pathogens. In Europe the term is often used to describe mastitis caused by environmental influences.
environmental pathogen	Pathogen that causes mastitis and whose primary origin is the environment of dairy cows and not infected mammary glands. The two major groups of environmental pathogens are the coliform bacteria and species of streptococci other than <i>Streptococcus agalactiae</i> and <i>Streptococcus dysgalactiae</i> .
environmental streptococci	Several streptococcal species that are found in the animal's environment that come into contact with teat ends leading to intramammary infection and mastitis. The major species involved is <i>Streptococcus uberis</i> . See individual streptococcal species.
enzyme-linked immunoabsorbent assay	See <b>ELISA</b> .
epidemic	Occurrence in a population or region of cases of disease clearly in excess of normal expectancy. This is frequently taken as more than two standard deviations greater than the mean occurrence.
epidemiology	Study of the frequency, distribution and determinants of health and disease in populations.
epithelium	Superficial layer of cells covering an interior or exterior body surface.
epithelial cells	In the context of mammary glands, the cells lining the sinuses and cavities. They are shed into milk and are a component of the milk somatic cells and constitute a small proportion of milk somatic cells in uninfected mammary glands. Compare <b>milk secretory cells</b> .



erosion	Destruction of the tissues of the teat end and in particularly the tissue surrounding the opening of the streak canal.
<i>Escherichia coli</i>	Gram-negative, short rod shaped coliform bacterium. Isolates are lactose positive, citrate negative and sometimes motile. A major cause of environmental mastitis and severe clinical mastitis.
esculin (US); aesculin (UK)	Glucoside found in the bark of the common horse chestnut tree and used as a biochemical test to differentiate streptococci, e.g. <i>Streptococcus agalactiae</i> and <i>Streptococcus dysgalactiae</i> are esculin negative while <i>Streptococcus uberis</i> is esculin positive.
esculin blood agar; EBA (US); aesculin blood agar (UK)	Solid bacteriological growth medium used for the primary culture of milk samples intended for the purpose of diagnosis of intramammary infection. The medium contains an agar base with blood or red blood cells. Esculin is added to facilitate the differentiation between esculin-negative from esculin positive streptococci which grow into brown colonies owing to esculin hydrolysis.
estrogen (US); oestrogen (UK)	Hormone or chemical messenger that determines reproductive behavior such as heat or estrus and influences mammary growth and development.
etiology (US)/ aetiology (UK)	Study of the causes of disease in a population.
ewe	Mature female sheep.
exacerbative mastitis	Condition of clinical or subclinical mastitis where the signs aggravate or become clinical. Some veterinary practitioners/clinicians may refer to this situation as a <b>flare up</b> , particularly in the United States.
external teat sealant; external teat sealer	Material applied to the external surfaces of the teat to shield the teat orifice region from mastitis pathogens in the animal's environment. These materials are usually applied by dipping or spraying and form a thin artificial film, sometimes with germicidal activity, over the teat skin.
extra label drug use	Use of a drug in a manner or for a purpose other than the regulatory approved drug usage. It can only be prescribed by a veterinarian.
extended dry period	Any dry period that exceeds 65 days in duration.
extended lactation	Lactation that exceeds 305 days in duration.
external teat sealer	See <b>external teat sealant</b> .
facultative aerobic bacteria	Bacteria that can grow in both the presence and absence of oxygen.
false negative	When the result of an individual test is negative but the disease or condition truly is present.
false positive	When the result of an individual test is positive but the disease or condition truly is not present.
fatty acid	Chain of carbon terminated by an acid carboxyl group (COOH). Fatty acids with less than 4 carbons are volatile; fatty acids with 5-20 carbons are found as fats and oils. The degree to which they are able to bind hydrogen ions determines the physical characteristics; hydrogen unsaturated acids are more likely to be liquid oils than hydrogen saturated fatty acids.
fever	Abnormally high body temperature, one cause of which can be bacterial infection.
fibrin	Insoluble protein end product of blood coagulation.
fibrosis	Replacement of damaged mammary secretory tissue with fibrous connective or scar tissue.
flakes	Small loose mass or bit that is generally thin and flattened. Generally used in describing clinical mastitis and is one of the signs of clinical mastitis. Compare <b>clot</b> .

flaming	Procedure used to remove hair from the udder. A "cool" flame (yellow) from a propane torch is quickly passed over the udder to singe the hair.
flare up	See <b>exacerbative mastitis</b> .
flinch, step, kick; FSK	Behavioral measure of discomfort.
flock (mastitis)	Group of sheep or goats kept together for milk production. It also applies in the context of a mastitis administrative unit for the purposes of applying regulations and control programmes. Compare <b>herd</b> .
fluid therapy	Therapy generally applied to severe mastitis cases that involves oral administration of large quantities of water or the intravenous infusion of water or hypertonic saline.
foremilk	Milk stripped from the udder prior to milking but after discarding the very first streams of milk.
foremilk sample	Sample of milk stripped from the udder or a teat prior to milking and following milk let-down. The very first streams of milk from a teat are strict foremilk and should be discarded prior to collection of the foremilk sample.
forestrip	Process by which the first few streams of milk are manually expressed from the teat prior to milking. In many instances, the purpose of forestripping is to observe the foremilk for evidence of clinical mastitis and to flush dirt and bacteria from the streak canal.
Fossomatic	Electronic instrument used to count milk somatic cells. The DNA of the cell nucleus is stained with fluorescent dye and the fluorescent emitting cells are counted as they move through a light beam. (Foss Electric, Hillerød, Denmark.) Note. This instrument is commonly used in various countries. Its mention here does not imply that the IDF only recognizes or recommends this specific instrument. Other brand-named instruments are available and used on a worldwide basis.
free stall; cubicle	Type of stall used in some housing systems. Animals are free to use the stalls for resting either standing or lying down and may at any time exit the stall. The term "free stall" is used primarily in North America and is synonymous with " <b>cubicle</b> " in Europe.
free stall barn	See <b>cubicle barn</b> .
frequent milk out	Milking frequently (say more than 5 to 6 times) an animal over a 24 hour period, than is generally the case.
FSK	See <b>flinch, step, kick</b> .
Fürstenberg's rosette	Anatomical structure of the proximal end of the streak canal. The structure is mucosal folds lining the inner end of the streak canal and these tissues may be a major point of entry for leukocytes into the teat cistern. Antibody producing cells have been demonstrated in these tissues. Compare <b>cricoid ring</b> .
galactopoiesis	All of the factors required for the maintenance of lactation in females. Enhancement or maintenance of established lactation under the influence of specific hormones, primarily growth hormone in the bovine.
gamma- haemolytic (US) gamma haemolytic (UK)	Description of streptococci which are non-hemolytic or have no effect on blood agar.
garget	Archaic terminology for signs of clinical mastitis in the bovine mammary gland.
genetic selection	Process of selection of superior individuals in a herd for breeding to enhance the performance of future generations.
geometric mean	Measure of central tendency calculable only for positive values and computed by taking the logarithms of the values, calculating their arithmetic mean and then converting back to the original units by taking the antilogarithms; or the nth root of the multiplication of n numbers during an observation time where n equals the number of observations.

germicide	See <b>disinfectant</b> .
gland cistern; udder cistern	Cavity at the distal portion of the udder where milk accumulates from the large milk ducts before entering the teat cistern.
globulin(s)	Protein(s) present in blood serum that are insoluble in distilled water. The immunoglobulins or antibodies are generally associated with the globulins.
glucocorticoid	Steroid hormone synthesized by the adrenal cortex of vertebrates. Some have anti-inflammatory activity.
gluconeogenesis	Metabolic pathway for reconstitution of glucose after it has been broken down.
glycerine	Emollient commonly used in teat disinfectants.
Gram-negative	Microorganism that stains red with Gram-stain as a result of the chemical composition of the cell wall.
Gram-positive	Microorganism that stains blue/purple with Gram-stain as a result of the chemical composition of the cell wall.
Gram-stain	Stain (crystal violet) and counter stain (safranin) that stain the cell wall of microorganisms. Gram-positive organisms stain blue/purple with crystal violet and Gram-negative organisms stain red with safranin. Differences in staining relate to differences in chemical composition of cell walls.
green streptococci	See <b>viridans streptococci</b> .
gutter	Trough for collecting and carrying urine and manure away from animals. Generally found in tie stall or stanchion barns and in parallel parlors.
heifer	Cow that has never given birth. Note. Cows in their first lactation should be referred to as first lactation cows. In some places 'heifer' is used to describe a cow in her first lactation.
hemodigestion(US); haemodigestion (UK)	Hemolysis that sometimes occurs within the initial streak of a milk sample on a blood agar plate and is due to proteolytic enzymes present in milk.
hemolysin (US); haemolysin (UK)	"toxin" secreted by bacteria (in this case) which causes haemolysis, that is break-down of the red blood cells. Compare <b>beta-haemolysis</b> .
hemolysis (US) ; haemolysis (UK)	Break down of red blood cells with liberation of hemoglobin.
herd	Animals in one production unit on a farm. The term generally applies to animals of one type but herds exist combining milking sheep and goats in some places. It also applies in the context of a mastitis administrative unit for the purposes of applying regulations and control programmes. Compare <b>flock</b> .
herd cell count: herd composite cell count	Result of somatic cell count performed on co-mingled milk from all mammary quarters in the herd, some of which are very likely to be producing abnormal milk. As delivery of abnormal milk to the bulk tank is not allowed there is a difference between <i>herd cell count</i> and <i>bulk milk somatic cell count</i> .
herd composite milk	Co-mingled milk from all mammary quarters in the herd.
herd level	Level of decision in response to mastitis in which only the complete herd is taken into consideration; the typical decision for investment in a preventive program or a more strategic protocol, such as blanket dry cow therapy, selective dry cow therapy or no such therapy.
herrinUKone parlor	Parlor in which the animals are milked in groups and the operator stands in a pit. The animals stand at an angle of 35° to 85° relative to the pit. Animals are milked from the side or through the hind legs. A double herrinUKone parlor has animals on both sides of the pit.
high cell count herd	Herd with a bulk milk somatic cell count that approaches or exceeds the local regulatory limit for somatic cell count.

high-level milking system; high-line milking system	System wherein the milk inlet to the milking line or recorder jar is more than 1.22 m (approximately 4 ft) above the standing level of the animal.
holding pen	Space generally in close proximity to a milking parlor where animals are held prior to entering the milking parlor.
homeopathy	Alternative treatment of prevention of diseases with heavily diluted preparation which are thought to cause effects similar to the symptoms presented.
hormone	Chemical messengers secreted by endocrine (ductless) glands that interact to determine many physiological phenomena. The reproductive cycles and the initiation and daily function of lactation are under the control of several interacting hormones.
hyperemia (US)/ hyperaemia (UK)	Superabundance of blood in an organ. Distinction can be made between an arterial hyperemia (active, for example by muscle activity) or venous hyperemia (passive, for example by blood stasis due to impairment of blood flow).
hyperkeratotic lesions	Increase in the thickness of the stratum corneum of the teat canal epithelium resulting in obvious erosions of the teat skin in the area of the teat apex. Such lesions occur mainly in connection with high vacuum, overmilking, high compressive loads and/or application of positive pressure.
hyperkeratosis	Build-up of keratin tissue at the distal end of the streak canal. A thickening of the horny layer of the skin surrounding the opening of the streak canal.
IDF	See <b>International Dairy Federation</b> .
IMI	See <b>intramammary infection</b> .
immunocompetence	Ability to produce normal immune response.
immunodeficiency	Impaired ability to produce normal immune response.
immunoglobulin	Protein produced by the immune system in response to the presence of antigens that specifically bind with that antigen. (Compare <b>antibody</b> ).
incidence density	See <b>incidence rate</b> .
import risk analysis; IRA	Investigation of the likelihood of a disease agent entering, establishing itself or spreading in a country and its potential impact on animal or human health, the environment and the economy. It is carried out in the risk analysis framework of the World Animal Health Organization (OIE) International Animal Health Code: Mammals, birds and bees (Ninth edition, 2000, OIE Paris).
incidence of mastitis	Rate of occurrence of mastitis in a population of animals. Mastitis incidence can be expressed in two different terms, true rate and risk rate. Compare <b>true rate</b> and <b>risk rate</b> and also <b>prevalence of mastitis</b> .
incidence rate; incidence density	Number of new cases of disease in a population per unit of animal-time during a given time period. <b>Compare rate of new infection</b> .
incidence risk, cumulative incidence	Probability that an individual animal will contract or develop a disease in a defined time period. Note. Only appropriate to calculate if the population is closed i.e. no animals leaving or entering the population throughout the defined time period.
incident	See <b>case of clinical mastitis</b> .
individual stall parlor	See <b>side-opening parlor</b> .
induration	Hardening of an area of the body as a reaction to inflammation, hyperemia, or neoplastic infiltration.
infection	Invasion by (or presence of) and multiplication of pathogenic microorganisms in a body part or tissue, which may produce subsequent tissue injury and progress to overt disease through a variety of cellular or toxic mechanisms.

infection rate	Number of new infections detected over a given time period, e.g. new infections per cow per 305 days.
inflation	Lay term used to describe a liner. See <b>liner</b> .
inflammation	Localized protective reaction of tissue to irritation, injury or infection characterized by pain, heat redness, swelling and sometimes loss of function.
inflammatory edema (US); inflammatory oedema (UK)	Accumulation of protein-rich fluid in the interstice due to an increase in the vascular permeability. Compare <b>edema</b> .
in-line filter	Filter placed in the milk line that collects clots and other debris. On some occasions the filter is placed in the long milk tube and used as a monitor for clinical mastitis.
in-line parlor (US); in-line parlour (UK)	Tandem parlor with animals arranged head to tail. See <b>side opening parlor</b> .
internal teat sealer	Stable viscous inert material (bismuth subnitrite) which is infused into the teat canal and lower teat sinus region to form an artificial teat plug which remains in place over the dry period, imposing a physical barrier to the ingress of udder pathogens from the environment. It is sometimes infused jointly with an antibiotic
International Dairy Federation; IDF	Worldwide organization for the dairy sector. Website: <a href="http://www.fil-idf.org">http://www.fil-idf.org</a> .
intra-mammary	Within or into the mammary gland.
intra-mammary infection; IMI	Infection occurring in the secretory tissue and/or the ducts and tubules of the mammary gland (IMI). Diagnosed by microbiological culture of aseptically obtained milk samples.
intra-mammary infusion	Delivery of a drug or other substance into the teat cistern by placing a cannula through the streak canal and through which the substance is infused.
intra-mammary infusion product	Product, generally an antibiotic preparation, specifically designed to be administered to the mammary gland by the process of intra-mammary infusion.
intramuscular	Within or into the muscle.
intravenous	Within or into the vein.
involution	Shrinkage and loss of function and organization of a tissue. The process by which mammary tissue reverts to a non-lactating state following the cessation of milk removal from the gland. Compare <b>drying off</b> .
iodophor	Complex of iodine and a surfactant that releases free iodine in solution, used as an antiseptic and disinfectant.
ISO 5707	International standard for milking machines. See ISO 5707. 1996. Milking machine installations - Construction and performance. International Organization for Standardization (ISO), Geneva, Switzerland.
jar	See <b>recorder jar</b> .
jetter assembly	See <b>teatcup jettors</b> .
keratin	Waxy substance produced by the epithelial cells lining the streak canal that serves as a plug between milkings and during the non-lactating period and aids in reducing penetration by microorganisms.
keratin reaming; teat reaming	Physical act of removing keratin from the streak canal.
ketone bodies	Intermediates of carbohydrate metabolism including acetone and hydroxybutyrate. Ketone bodies accumulate in high concentrations when the animal mobilizes energy rapidly at the onset of lactation.

<i>Klebsiella</i> spp.	Gram-negative, rod-shaped, coliform bacteria that is a major environmental pathogen. Isolates are lactose-positive, citrate-positive and non-motile. The species most frequently associated with bovine mastitis is <i>Klebsiella pneumoniae</i> .
lactation	Formation or secretion of milk. The combined process of milk secretion and milk removal. The period of milk production from calving to drying off. A typical lactation is 305 days in duration. Early lactation is defined as calving to 100 days. Mid-lactation is defined as 101 days to 200 days and late lactation is >200 days. End of lactation is defined as 6 days-in-milk (DIM) prior to drying off.
lactiferous gland	Specialized organ consisting of the milk secreting cells and the lactiferous tubules and ducts (the lactiferous system).
lactoferrin	Iron binding protein found in low concentration in normal bovine milk but in high concentration in the secretions of the non-lactating mammary gland. The protein can inhibit growth of bacteria requiring iron for normal growth and metabolism.
lactogenesis	Series of cellular changes whereby mammary epithelial cells are converted from a non-secretory state to a secretory state. The initiation of milk secretion under influence of specific hormones, mainly prolactin. Lactogenesis starts slowly a few days before parturition in ruminants. Compare <b>colostrogenesis</b> .
lactoperoxidase system	Enzymic system in milk that kills some bacteria and inhibits growth in others. The system is activated with hydrogen peroxide and thiocyanate ions.
lactose	Primary sugar in milk that is a disaccharide composed of glucose and galactose. Lactose fermentation is a biochemical test used to separate the coliform bacteria from other Gram-negative bacteria.
Lancefield Group	Serological test used to differentiate streptococcal species into groups A through O.
late lactation	Period of time in lactation defined as >200 days. Compare <b>lactation</b> .
latent infection	Persistence of an infectious agent within the host without signs of disease.
let-down	Lay terminology for the milk ejection process. See <b>milk ejection</b> .
leukocyte	Any of the white blood cells.
leukotriene	Arachidonic acid metabolites having potent pharmacological effects. Leukotriene B <sub>4</sub> is very involved in inflammatory processes.
linear score	Mathematical method of expressing somatic cell counts that allows for an assessment of milk yield loss and is primarily used in the United States. The mathematical calculation is as follows: $\ln(\text{SCC}/100)/.693147 + 3$ where SCC has been divided by 1,000.
liner	Flexible sleeve of rubber or similar material, having a mouthpiece and a barrel and which may have an integral short milk tube. The part of the milking machine that comes into contact with the teat. It is the collapse of the liner, caused by alternating the air pressure that exists between the liner and the shell, that massages the teat during milking.
liner crawl; liner creep	Movement of the liner upward on the teat during the milking process.
liner slip	Condition whereby the teat cups slide down the surface of the teat, allowing air to enter the liner. The intake of air is often accompanied by an audible squawking sound and has been associated with an increase in intramammary infection.
liner vacuum	Vacuum in the barrel below the teat for specified conditions of liquid and airflow during milking.
lipase	Enzyme that breaks down triglycerides to free fatty acids, leading to rancidity of milk.
lipid	Fat or fat-like substances that act as a nutritional energy source.

long milk tube; long milk hose	Connecting tube carrying away from the cluster to the pipeline, bucket, recorder jar or other collection device.
long pulse tube; long pulse hose	Connecting tube between the pulsator and the cluster for transmitting cyclic pressure changes.
long milk looped milkline	Milk line which forms an enclosed circuit with two full-bore connections to the receiver.
looped pulsation line	Pulsation line which forms an enclosed circuit with two full-bore connections to the receiver.
loose housing	Large enclosed area for multiple animals without individually partitioned resting areas.
loss	See <b>production loss</b> .
low cell count herd	A herd whose bulk tank milk somatic cell count is well below the regulatory limit for somatic cell count.
low-level milking system	System wherein the milk inlet to the milkline or recorder jar is below the standing level of the animals.
lumen	Space in the center of an alveolus that is the point where milk first accumulates upon secretion.
lymphocyte	Type of white blood cell involved in the immune response. Lymphocytes are a component of milk somatic cells. Compare <b>polymorphonuclear neutrophil</b> .
lysozyme	Enzyme that increases in mastitis and destroys the cell walls of certain bacteria.
machine stripping	Process applied to the udder at the end of milking in an effort to harvest any milk remaining in the udder. The process involves pulling down on the cluster while massaging the udder with a free hand.
macrophage	Type of white blood cell that engulfs and destroys microorganisms. Macrophages are important in the initiation of the inflammatory response and presentation of antigen to other parts of the immune system. Macrophages are a component of milk somatic cells and the predominant cell type in milk from uninfected mammary glands.
main airline	Part of the airline between the vacuum pumps and the sanitary traps.
major histocompatibility complex	Set of cell surface self markers. Important in cell-to-cell communication and immune reactions.
major pathogen	Historic term used to describe any microorganism capable of infecting the mammary gland and resulting in measurable economic loss. In general, all pathogens other than <i>Corynebacterium bovis</i> and the coagulase negative staphylococci were considered to be major mastitis pathogens. The term is also used at times to describe the relative proportion of pathogens in a herd.
mammary gland	Any of the milk-producing glands in female mammals, consisting of lobes containing clusters of alveoli with a system of ducts to convey the milk to an external nipple or teat. These glands typically occur in pairs and start secreting around parturition. The cow and the buffalo have four mammary glands that are collectively called an udder. Sheep and goats have two glands collectively called an udder.
mammary half	Any two of the four mammary glands of the animal's udder or one of the two mammary glands of the udder of ewes and does.
mammary quarter	One of the four mammary glands within the cow's or buffalo's udder.
mammogenesis	Development (growth and differentiation) of the mammary gland tissue (ducts and alveoli) under influence of specific hormones. Occurs mainly during pregnancy (especially during the dry period) but may also continue in lactation under the influence of sex steroids.

manual reserve	Reserve vacuum pump capacity measured at the same position and conditions as for effective reserve except that the vacuum is not controlled by the vacuum regulator.
mastitis	Inflammation of one or more quarters of the mammary gland, almost always caused by infecting microorganisms.
mastitis pathogen	Archaic term. The preferred terminology is <b>udder pathogen</b> .
mastitis survey	Investigation of mastitis in which the information that is representative of the population is systematically collected.
maximum residue limit; MRL	Maximum concentration of residue resulting from administration of a veterinary medicinal product which is legally permitted or recognized as acceptable in or on a food.
mean vacuum	Arithmetic mean of all values registered by automatic data acquisition (or the area under the vacuum curve divided by the length of the measuring period when using a curve printer).
MIC	See <b>minimum inhibitory concentration</b> .
micelle	Dense protein granule found in milk and composed of casein molecules. The phosphate groups of the casein molecules are involved in binding calcium via ionic bonds. These interactions are key to creating the micelle.
microbial susceptibility	Condition in a microorganism whereby it is susceptible to the action of a drug such as an antibiotic.
microbial susceptibility testing	Laboratory procedure used to determine which drugs, generally antibiotics, will kill or inhibit the growth of a strain of bacteria or other microbial agent.
microorganism	Any one of a large variety of microscopic or ultramicroscopic organisms, such as viruses, bacteria and yeasts.
mid-lactation	Period of time in lactation from 101 days to 200 days. Compare <b>lactation</b> .
mid-level milking system	System wherein the milk inlet valve or milk inlet to the bucket, milkline or recorder jar is 0 - 1.2m (0-4 ft) above the standing level of the animals.
mild clinical mastitis	Observable abnormalities in milk, generally clots or flakes, with little or no signs of swelling of the mammary gland or systemic illness. Preferred terminology when describing severity of clinical cases.
milk	Milk is a secretion from female mammals. Its primary purpose is to nourish the young. It comprises essential nutrients the proportions of which vary with species. Milk is also intended for human consumption as liquid milk or for processing into other foodstuffs.
milk ejection reflex	Stimuli applied in connection with the milking process causes the release of oxytocin from the posterior pituitary gland. The oxytocin causes the contraction of myoepithelial cells surrounding the alveoli with the consequence that alveolar milk is forced into the ducts and gland cistern. Secondary effects of milk ejection can be observed as changes in intramammary pressure, smooth muscle tone and blood circulation.
milk ejection	Process through which milk is squeezed out of milk producing tissue by the action of the hormone, oxytocin, on myoepithelial cells. Myoepithelial cells surround the alveolus which empties into the small milk ducts.
milking machine	Complete machine installation for milking, usually comprising vacuum system, pulsation system, milk system, one or more milking units, and other components.
milk inlet	Fixed inlet into a milkline, recorder jar, bucket, claw or other equipment to permit connection of the long milk tube.
milk jar	See <b>recorder jar</b> .



milkl ine; milking pipeline	Pipeline which carries milk and air during milking and which has the dual function of providing milking vacuum to the milking unit and conveying milk to a receiver.
milk line filter	Filtering device placed in the milkl ine prior to the receiver. Sometimes used as a management tool to observe for clots from mastitic animals.
milking parlor (US); milking parlour (UK)	Structure where animals are confined specifically for the purpose of milking.
milking unit	Assembly of components, necessary for milking an individual animal and which can be replicated in a milking machine so that more than one animal may be milked at one time Note. The milking unit may include, for example, a cluster, long milk tube, long pulse tube, and a pulsator, plus, perhaps, a bucket or recorder jar, or milk meter and other individual accessories.
milking vacuum	Vacuum to which the teat of the cow is exposed when the inflation is open. Milking vacuum is responsible for the flow of milk from the mammary gland to the cluster.
milk meter	Device used to measure all the milk from an individual animal or teat that does not require the collection of the milk into a single container and weighing on a scale, and does not significantly affect the normal milking procedure and the quality of harvested milk.
milk outlets	Outlet through which milk exits the claw which is attached to the long milk tube.
milk phase	Period of time during the pulsation cycle when vacuum is applied to the space between the liner and the shell of the teat cup. The period during which milk flows from the teat.
milk-producing tissue	Alveoli which consist of the secretory epithelial cells.
milk pump; releaser; releaser milk pump	Pump for removing milk from vacuum and discharging it to atmospheric pressure.
milk removal	Passive removal from the cisterns and active ejection of milk from the alveolar lumen towards the cisterns under influence of oxytocin.
milk:rest ratio	Ratio of the time during which milk can flow from the teat (the milking phase) to the time during which milk flow is prevented by the compressive force applied by the liner (the rest phase) within a pulsation cycle. Usually, this ratio is expressed as two numbers which add up to 100, e.g. 65:35.
milk robot	See <b>automatic milking system</b> .
milk secretion	Synthesis of milk components (water, electrolytes, lactose, fat and protein) by the mammary epithelial cells and transfer of milk from the epithelial cell to the alveolar lumen.
milk secretory cells	Cells in the mammary gland that synthesize and secrete milk. They form the larger unit called an alveolus. Compare <b>epithelial cells</b> .
milk temperature	Temperature of milk as measured in the claw of the milking machine that is sometimes used as an automated method of mastitis detection.
milk withholding time	Period of time when milk can not be sold for human consumption, generally resulting from the administration of a drug such as antibiotics to the animal or a period immediately following calving when colostrum is produced. Milk withholding times vary with the type of drug used and in accordance with national legislation.
minimum inhibitory concentration; MIC	Minimum concentration of an antibiotic in tissues that will kill or inhibit the growth of a microorganism.

minor pathogen	Historic term used to describe bacterial species that can infect the mammary gland but usually do not result in serious economic loss. Clinical mastitis is infrequent and generally mild but somatic cell counts are generally increased 2 to 4 fold over the somatic cell counts of uninfected quarters. <i>Corynebacterium bovis</i> and the coagulase-negative staphylococci have historically been designated as minor pathogens. The term is also used at times to describe the relative proportion of a pathogen in a herd.
moderate clinical mastitis	Visibly abnormal milk accompanied by swelling in the affected mammary quarter with an absence of systemic signs of illness. The terminology is preferred when describing the severity of clinical symptoms.
monitoring	Performance and analysis of routine measurements aimed at the early detection of changes in the prevalence and/or incidence of disease, health, or alteration in a production parameter.
mouthpiece	Top of the liner that prevents air intake around the teat and prevents air from entering the space between the liner and the shell.
MRL	See <b>maximum residue limit</b> .
mycobacteria	Slender, acid-fast rod shaped microorganisms. Examples include <i>Mycobacterium tuberculosis</i> which causes tuberculosis and <i>Mycobacterium paratuberculosis</i> which causes Johne's disease in cattle. <i>Mycobacterium smegalus</i> and others have been reported as a cause of mastitis in dairy cows.
<i>Mycoplasma</i> spp.	Microorganisms that are devoid of cell wall structure and are intermediate in size between bacteria and viruses. Mycoplasma differ in the conditions they need to grow in the diagnostic laboratory, making them harder to detect than the common mastitis-causing bacteria. <i>Mycoplasma bovis</i> is the species most often associated with bovine mastitis.
myoepithelial cells	Elastic epithelial cells that surround the alveolus. They can respond to hormonal signal (oxytocin) to contract and squeeze milk out of the alveoli.
N-acetyl- $\beta$ -D-glucosaminidase	Lysosomal enzyme that is secreted in large quantities in the mammary gland during involution and inflammation. The enzyme activity in mammary secretions is sometimes used as an indicator of tissue changes that accompany inflammation.
NAGase	See <b>N-acetyl-<math>\beta</math>-D-glucosaminidase</b> .
National Mastitis Council	See <b>NMC</b>
natural exposure trial	Mastitis trial in which teats are exposed to the microorganisms normally present in the environment of the animals under study. No attempt is made to increase the number of microorganisms in the environment and this is in contrast to a challenge trial.
neutrophil	See <b>polymorphonuclear neutrophil</b> .
new infection	Isolation of a pathogen following culture of milk from a mammary gland that has not previously been isolated from that mammary gland or has not been isolated for some predetermined period of time that generally exceeds 30 to 60 days.
NMC	Organization headquartered in the United States that promotes mastitis control in dairy herds and the production of quality milk; website: <a href="http://www.nmconline.org">http://www.nmconline.org</a> (formerly National Mastitis Council).
<i>Nocardia</i> spp.	Gram-positive organism that appears as branched, slender filaments with shorter fragmentation forms of rod and coccoid figures. The organism is partially acid-fast, slow growing and is considered to be an environmental pathogen.
nominal vacuum	Vacuum specified by the manufacturer of the milking machine as the intended vacuum at a stated site on the machine. The level is indicated by the vacuum gauge.

non-bacterial mastitis	Form of mammary inflammation in which no microorganisms can be isolated from milk samples. Failure to isolate microorganisms does not necessarily prove that the inflammation was not due to the presence of a microorganism. Also referred to as non-specific mastitis.
non-specific mastitis	See <b>non-bacterial mastitis</b> .
non-steroidal anti-inflammatory drug; NSAID	Class of drugs that suppresses one or more of the signs of inflammation. Such drugs generally function by blocking the metabolism of arachidonic acid or its metabolites.
normal milk	Milk free from detectable signs relating to mammary quarter inflammation and infection. Compare <b>Abnormal milk</b> .
NSAID	See <b>non-steroidal anti-inflammatory drug</b> .
oedema (UK)	See <b>edema</b> .
Oestrogen (UK)	See <b>estrogen</b> .
OIE	See <b>World Animal Health Organisation</b> .
open tandem parlor (US); open tandem parlour (UK)	See <b>Side opening parlor</b> .
opportunistic pathogen	Microorganism causing disease only under certain conditions, for example, when the immune system is impaired.
opsonin	Various proteins, acting as complement or as antibodies that bind to foreign particles and microorganisms, making them more susceptible to the action of phagocytes.
opsonization	Enhancement of phagocytosis, binding antigens in a membrane by antibodies or complement molecules or both.
organic milk production	Milk produced on farms that comply with all conditions for organic farming.
organoleptic	Of properties detected by sight, smell, or taste.
osmotic pressure	Pressure gradient between a concentrated solution and a weak solution of salts in water that leads to a shift of water to try to equate the concentrations.
overmilking	Process of allowing the milking machine to remain attached to the udder following completion of the milking. Generally considered to be a bad milking practice.
oxidase	Any of a group of enzymes that catalyze oxidation.
oxidative burst	Increased production of reactive oxygen metabolites in phagocytic cells following phagocytosis of bacteria and other microbial pathogens.
oxytocin	Hormone produced by the anterior pituitary gland that is responsible for milk ejection.
parenteral	Taken into the body in a manner other than through the digestive canal. Used to describe therapy administered other than through the mammary gland
parenteral therapy	Therapy administered in a manner other than through the mammary gland.
parallel parlor	Milking parlor where animals stand at a 90 degree angle from the operator pit and are milked between the rear legs.
partial dry cow therapy	See <b>selective dry cow therapy</b> .
partial insertion	Technique for insertion of cannulas into streak canals that involves insertion of the tip of the cannula only 1 to 2 mm into the streak canal.
parity	Condition or fact of having borne offspring. The number of parities for an animal equals the number of times the animal has borne offspring.

parlor (US); parlour (UK)	Structure where animals are confined specifically for the purpose of milking.
pathogen	Any disease producing agent such as a bacterium, virus or other microorganism.
pasteurization	Heat treatment process applied to a product with the aim of avoiding public health hazards arising from pathogenic microorganisms associated with milk. The process of heating milk to a precise temperature for a timed period to kill bacteria. Pasteurization may not kill all bacteria so does not sterilize milk.
penetrability	See <b>streak canal penetrability</b> .
peracute clinical mastitis	See <b>severe clinical mastitis</b> (preferred).
petechia; petechial hemorrhages (US) ; petechial haemorrhages (UK)	Small, point-like hemorrhages in teat skin or other tissues (capillary hemorrhages).
phagocytosis	Process by which white blood cells engulf microorganisms or other matter.
PIC	See <b>preliminary incubation count</b> .
pipeline milking system	Milking machine in which milk flows from the cluster into a milkline that has the dual function of providing milking vacuum and conveying milk to a milk receiver.
pit	Lower area of a milking parlor where the operator works.
plasma albumin	Simple protein found in the liquid phase of the blood (plasma) and in milk. See <b>bovine serum albumin</b> .
plasmin	Enzyme that breaks down milk casein as well as fibrin clots.
plasminogen	Inactive form of plasmin.
plate loop count	Laboratory test that estimates the total number of bacteria present in a milk sample but does not determine the types of bacteria present in the sample. The test is used by some milk procurement agencies.
PMN	See <b>polymorphonuclear neutrophil</b> and the abbreviation recommended. Note also PML or PMNL (polymorphonuclear leukocyte).
polymorphonuclear neutrophil; PMN; neutrophil	Type of white blood cell that can phagocytize and kill microorganisms. A component of milk somatic cells and the predominant cell type in infected mammary glands.
point prevalence	See <b>prevalence</b> .
pooled milk	Milk mixed from different sources.
post-dipping	Submerging teats in a germicide after milking for the purpose of reducing the rate of new infection caused by contagious pathogens.
post-milking teat disinfection	Application of an approved teat disinfectant by means of conventional methods (such as immersion/dipping or spraying) to the teats immediately after the clusters have been removed at the end of milking. Compare <b>pre-milking teat disinfection</b> .
post-spraying	Spraying teats with a germicide after milking for the purpose of reducing the rate of new infection caused by contagious pathogens.
pre-clinical mastitis	See <b>subclinical mastitis</b> .
pre-dipping	Submerging teats in a germicide before milking. Use is reported to reduce rate of new infection caused by environmental pathogens.
preliminary incubation count; PIC	Quantitative test that determines the number of psychotrophic (cold tolerating) bacteria in a milk sample. The test is used by some milk procurement agencies as a milk quality test and is thought to be an indicator of shelf life of milk products.

pre-milking teat disinfection	Application of an approved teat disinfectant by means of conventional methods (such as immersion/dipping or spraying) to the teats during the preparation of the udder for milking. Compare <b>post-milking teat disinfection</b> .
pre-spraying	Act of spraying teats with a germicide prior to milking. Use is reported to reduce rate of new infection caused by environmental pathogens.
prevalence	Proportion of cases of a disease or other condition present in a population without any distinction between old and new cases. When used without qualification the term usually refers to the number of cases as a proportion of the population at risk at a specified point in time (point prevalence).
prevalence of mastitis	Proportion of animals or mammary gland quarters that show signs of mastitis at any one time. Compare <b>incidence of mastitis</b> .
production loss	Production of milk that is lower than physiologically and normally expected in relation to an individual animal.
progesterone	Hormone or chemical messenger that determines reproductive behavior such as pregnancy, and acts in balance with other hormones such as estrogen. Influences mammary growth and differentiation.
prokaryote	Unicellular organisms such as bacteria that lack a distinct nucleus and membrane-bound organelles.
prolactin	Hormone produced in the anterior pituitary gland that is a key messenger in the initiation of lactation.
prostacyclin	Prostaglandin that specifically inhibits the formation of blood clots.
prostaglandin	Any of a class of unsaturated fatty acids that are metabolites of arachidonic acid and that are involved in the contraction of smooth muscle, the control of inflammation and body temperature and many other physiological functions.
proteolytic enzymes	Enzymes that split or cleave proteins.
proteomics	Study and application of knowledge of the proteome that is the complete protein complement expressed by the genome of an organism.
<i>Proteus</i> spp.	Gram-negative, citrate-negative/positive, lactose-negative oxidase-negative, motile, rod-shaped bacteria. <i>Proteus</i> spp. are considered to be environmental mastitis pathogens.
<i>Prototheca</i> spp.	Blue-green alga that is occasionally isolated from infected bovine mammary glands.
<i>pseudomonads</i>	See <b>Pseudomonas</b> .
<i>Pseudomonas</i> spp.	Gram-negative, citrate-positive/negative, lactose-negative, oxidase-positive, motile, rod-shaped bacteria. <i>Pseudomonas</i> spp. are considered to be environmental mastitis pathogens.
pseudopodia	Finger-like projections of leukocytes, which aid in the phagocytosis/engulfment of bacteria.
psychrotrophic bacteria; psychrotroph	Bacteria that thrive at low temperatures, unlike most disease-causing bacteria, which are adapted to grow at body temperature. Psychrotrophic bacteria growing in milk and on milking equipment may cause milk spoilage. They are usually an environmental contaminant and used as an indicator of hygiene.
pulsation	Cyclic opening and closing of a teatcup liner.
pulsation chamber	Annular space in a teat cup between the liner and the shell.
pulsation cycle	One complete liner movement sequence.
pulsationless milking	Experimental milking machine that did not use pulsation in the teat cups to massage the teat during milk removal.

pulsation rate	Number of pulsation cycles per minute.
pulsation ratio	Amount of time a pulsator creates vacuum to open the liner divided by the amount of time it admits air to collapse the liner. Compare <b>pulsator ratio</b> .
pulsation vacuum	Vacuum recorded on the pulsation line or between inflation and the shell.
pulsator	Device that cyclically switches a connected vessel, usually the pulsation chamber, between vacuum and (atmospheric) pressure, thus opening and closing the liner to provide for milk flow alternatively with massage to the teat.
pulsator ratio	Sum of the durations of the increasing vacuum phase and the maximum vacuum phase divided by the duration of one pulsator cycle or pulsation cycle.
pus	Yellowish-white more or less viscous substance produced by suppuration and found in abscesses, sores, infected mammary glands, etc., consisting of a liquid plasma in which white blood cells are suspended and often aggregated.
pyrexia	Fever.
quality	Characteristics of a product that meet certain goals defined by the user of the product.
quarter; udder quarter	One teat of a milking animal with four teats.
quarter level	Level of decision in response to mastitis in which only one quarter of an udder is taken into consideration: typically a decision of whether or not to start drying off. It concerns the potential extra profit to be made by trying to keep an animal until the optimum moment for replacement, in comparison with immediate replacement.
quarter milker	Milking machine designed to keep the milk from the individual quarters separate. Used primarily for research purposes.
quarter sample	Milk sample taken from one udder quarter.
quarter somatic cell count	Somatic cell count obtained from a sample of milk obtained from a single quarter, thus from one functional mammary gland, of a milking animal.
random sample	Sample of a population assembled so that each member of the population has an equal and non-zero opportunity to be selected.
rapid exit parlor	Milking parlor constructed to permit the release of groups of animals at the completion of milking.
rate of new infection	Number of new infections detected in a population of animals over a specified period of time divided by the specified time period, e.g., number of new infections per 100 animals per 305 days. Compare <b>incidence rate</b> .
reactive hyperemia (US); reactive hyperaemia (UK)	Increased blood supply of an organ to compensate for a temporary reduction of blood supply.
receiver	Vessel which receives milk from one or more milklines or milk transfer lines, separates milk from air and feeds the releaser, releaser milk pump or collecting vessel under vacuum.
receptor	Specific binding site for a biochemical messenger on the cell membrane. Receptor binding by physiological and pharmacological substances leads to a specific physiological action (for example contraction of smooth muscle). See <b>cell membrane receptor</b> .
recorder jar; milk jar; weigh jar	Graduated vessel which receives, holds and allows measurement of all the milk from an individual animal and allows transfer of the milk to a receiver or milk collecting vessel under vacuum. Sometimes referred to simply as a jar.

recorder milking machine	Milking machine in which milk flows from the cluster into a recorder jar supplied by vacuum from a milking vacuum line and is kept in the recorder jar during milking of each animal Note. Milk is discharged when required from the recorder jar either into a milk receiver by a milk transfer line or into a collecting vessel.
recurrent clinical mastitis case; repeat clinical mastitis case	Multiple cases of clinical mastitis within the same mammary quarter caused by the same pathogen and where there has been no bacteriological cure between clinical episodes.
refrigerated bulk milk tank	Equipment for refrigeration and bulk storage of refrigerated raw milk, freshly milked.
regional level	Level of decision in response to mastitis in which a defined region is taken into consideration: typically a decision relating to general use of diagnostic procedure, culling policy, treatment policy or the building up of a preventive program.
regulator	See <b>vacuum regulator</b> .
regulator leakage	Airflow through the regulator when the vacuum in the regulator sensing point is decreased by 2 kPa by an air inlet in the milking machine.
releaser; releaser milk pump	See <b>milk pump</b> .
rennin	Proteolytic enzyme secreted in the neonate's stomach which cleaves $\kappa$ -casein and allows the casein micelle to come apart. The result of rennin action is to cause the precipitation of the casein or to cause curd formation.
repeat clinical mastitis case	See <b>recurrent clinical mastitis</b> .
replacement	Process of removing an animal from a production unit and replacing it with another animal, usually a heifer.
replacement cost	Extra cost or, better, net present value (NPV) of a replacement process.
residual milk; complementary milk	Total amount of milk left in the udder which was not removed immediately after milking. The only way to get residual milk out is by injection of oxytocin. Compare <b>strippings</b> .
residue	Drug or chemical remaining in the body or milk following therapy.
resistance	Likelihood that an animal will not be infected. <i>The term is sometimes used to describe the situation where a bacterial isolate is not affected by a specific antibiotic.</i>
resistance and susceptibility testing	Laboratory technique for determining whether or not a specific antibiotic will kill or inhibit the growth of a given bacterial isolate.
rest phase	Period of time during the pulsation cycle when atmospheric pressure is established between the liner and the shell of the teat cup. During this phase milk does not flow and the teat is massaged.
retention pay off; RPO	Profit to be expected in trying to keep an animal until the optimum moment of replacement, in comparison with immediate replacement. The retention pay off is lost when an animal is culled involuntarily as a consequence of mastitis.
reverse pressure gradient	Transient condition when pressure in the teat sinus is lower than the air or liquid pressure at the external teat orifice.
ribonucleic acid	See <b>RNA</b> .
ringing	Edema at the base of the teat forming a ring caused by vacuum in the mouthpiece chamber of the liner.

RNA	Abbreviation for ribonucleic acid. Ribonucleic acid serves as the messenger that "decodes" the genetic instructions in DNA and causes specific functional proteins to be made.
robotic milker	See <b>automatic milking system</b>
rotary parlor (US); rotary parlour (UK)	Parlor in which animals are handled individually and arranged on a circular platform (carousel) which rotates. Animals enter at one point on the rotating platform and are milked during one rotation and exit approximately 360° from entry. Animals may be in an abreast or a herrinUKone arrangement on the carousel and may face inward or outward. The operator can be positioned either on the inside or the outside of the carousel depending on the direction animals are facing.
RPO	See <b>retention pay off</b> .
safe level	Conservative estimate of a drug residue level in edible animal tissue derived from food safety data or other scientific information. Concentrations of residues in tissue below the safe level will not raise human food safety concerns. A safe level is not a safe concentration or a tolerance and does not indicate that an approval exists for the drug in that species or category of animal from which the food is derived. Used in the US by the FDA.
sanitary trap	Vessel between the milk system and the vacuum system to limit movement of liquid and other contaminants between the two systems.
sanitizer	Substance or preparation for killing germs designed for use especially on food-processing equipment.
saprophyte	Any organism that lives on dead organic matter, such as certain fungi and bacteria.
scar tissue	Fibrous tissue accumulating in the udder following inflammation that permanently replaces milk-producing tissue and may inhibit the movement of antibiotics to sites of infection.
SCC	See <b>somatic cell count</b> .
screening	Subjecting a population or sample of a population to a diagnostic test or procedure, with the objective of detecting disease. Tests used for this purpose are usually cheap, easily performed and sensitive but often not very specific.
secretory epithelial cells	Cells in the mammary gland that secrete milk. Compare <b>milk secretory cells</b> .
self cure	Elimination of pathogens without formal treatment.
selective dry cow therapy; partial dry cow therapy	Treatment of selected quarters or animals at drying off with antibiotics infused into the mammary glands in an effort to cure infected quarters and prevent new infections from occurring. The practice is in contrast to blanket dry cow therapy or no dry cow therapy. Compare <b>blanket dry cow therapy</b> .
sensitivity	Proportion of truly diseased animals in a screened population which are identified as diseased by a specified test.
septicemia (US); septicaemia (UK)	Invasion and persistence of pathogenic bacteria in the blood stream.
<i>Serratia</i> spp	Gram-negative rod-shaped environmental bacteria. Isolates are lactose-negative, citrate-positive and motile. Typical species involved in mastitis are <i>Serratia marcescens</i> and <i>Serratia rubidaea</i> .
serum albumin	See <b>blood serum albumin</b> .
severe clinical mastitis	Udder inflammation characterized by sudden onset with grave systemic and local symptoms. This terminology is preferred to <i>peracute clinical mastitis</i> .
shell	Rigid part of the teat cup used to retain the liner.



short milk tube	Connecting tube between the claw and the liner barrel, connector or sightglass. It is often a continuous part of the liner.
short pulse tube	Connecting tube between the pulsation chamber and the claw.
side opening parlor; individual stall parlor; open tandem parlor	Parlor in which animals are handled as individuals and are milked from the side. The operator is in a pit. Animals are arranged head to tail. Each animal exits the parlor as an individual and the side of the stall opens to release the animal.
simultaneous pulsation	Pulsation in which all liners in a cluster move in phase.
skin flora opportunists	Species of coagulase negative staphylococci that are normal flora of teat skin that can and do infect the mammary gland, generally causing mild inflammation.
smooth muscle tone	Tension of smooth muscle which is normally present under the influence of stretching and which can be influenced by the sympathetic nervous system, hormones and pharmacological drugs.
Somacount	Electronic instrument used to count milk somatic cells. The DNA of the cell nucleus is stained with fluorescent dye and the fluorescent emitting cells are counted as they move through a light beam. The machine can also be used to measure other milk components. (Bentley Instruments, Chaska, MN, USA.) Note. This instrument is commonly used in various countries. Its mention here does not imply that the IDF only recognizes or recommends this specific instrument. Other brand-named instruments are available and used on a worldwide basis.
Somascope	Electronic instrument used to count milk somatic cells. The DNA of the cell nucleus is stained with fluorescent dye and the fluorescent emitting cells are counted as they move through a light beam. (Delta Instruments, Drachten, Netherlands). Note. This instrument is commonly used in various countries. Its mention here does not imply that the IDF only recognizes or recommends this specific instrument. Other brand-named instruments are available and used on a worldwide basis.
somatic cells	Cells present in milk that include white blood cells (leukocytes) and a small percentage of epithelial cells. The cellular composition and concentration of cells changes dramatically during periods of inflammation. An increased somatic cell count is the primary indicator of inflammation of the mammary gland.
somatic cell count; SCC	Concentration of somatic cells in milk, determined in accordance with the methods in ISO 13366-1 and 2 IDF 148-1 and 2. Expressed in cells/ml.
SPC	See <b>Standard Plate Count</b> (of microorganisms).
specificity	Proportion of truly non-diseased animals in a population correctly identified by a specified test.
sphincter	Smooth muscle in a complex spiral or circular-oblique sheet of cells forming a ring that can act to keep a body part closed.
spontaneous cure	Infection that is eliminated without the aid of antibiotics or other drugs. Compare <b>self cure</b> .
spontaneous recovery	Ability of an animal to recover from an udder inflammation or cure an infection without the aid of antibiotics or other drugs.
stanchion	Framework consisting usually of two vertical bars, used to secure cattle in a stall.
standard plate count; SPC	Quantitative test that determines the total number of bacteria present in a milk sample but does not determine the types of bacteria present in the sample. Two serial dilutions are plated using the pour plate technique, plates are incubated and the count between or closest to 25 to 250 colonies is used. The test is used by most milk procurement agencies and by regulatory agencies. See <b>total bacterial count</b> (UK).

staphylococci	Gram-positive, catalase positive, spherical bacteria that form grape-like clusters when grown in broth and viewed microscopically.
<i>Staphylococcus aureus</i>	Gram-positive, catalase positive, coagulase positive (rabbit plasma), spherical shaped bacteria. <i>Staphylococcus aureus</i> are generally considered to be environmental and contagious udder pathogens.
stepped-on-teat	See <b>teat tramp</b> .
stray voltage	Small electrical currents in the animal's environment originating on or off the farm, which may elicit a response from animals.
streak canal; teat canal; teat duct; teat meatus	Structure at the distal portion of the teat through which milk flows from the teat cistern to the external environment. The canal is lined with skin-like epidermis and is the main barrier against infection. Closure is maintained by smooth muscles around the canal. <b>Streak canal</b> is the preferred term in some scientific journals, but not all.
streak canal colonization; streak canal infection	Attachment to and growth of a microorganism on the tissues of the streak canal.
streak canal penetrability; teat canal penetrability	Likelihood of penetration of the streak canal by udder pathogens.
<i>streptococci</i>	Gram-positive, catalase negative, spherical bacteria that grow in chains when grown in broth and viewed microscopically.
<i>Streptococcus agalactiae</i>	Gram-positive, catalase negative, esculin negative, CAMP positive, spherical shaped bacteria. <i>Streptococcus agalactiae</i> are considered to be contagious udder pathogens.
<i>Streptococcus bovis</i>	Gram-positive, catalase negative, esculin positive, CAMP negative spherical shaped bacteria. <i>Streptococcus bovis</i> are considered to be environmental udder pathogens.
<i>Streptococcus dysgalactiae</i>	Gram-positive, catalase negative, esculin negative, CAMP negative spherical shaped bacteria. <i>Streptococcus dysgalactiae</i> behave like contagious pathogens in some dairy herds and an environmental pathogens other herds.
<i>Streptococcus uberis</i>	Gram-positive, catalase negative, esculin positive, generally CAMP negative but some strains are CAMP positive, spherical shaped bacteria. <i>Streptococcus uberis</i> are considered to be environmental pathogens and are the major species of esculin positive streptococci involved in bovine mastitis, but some strains can act as contagious pathogens.
strict foremilk	Milk from the teat cistern sampled without any udder preparation and before milk ejection has occurred. Normally this is milk withdrawn by the first two or three squirts of milk from the teat. Compare <b>alveolar milk</b> , <b>cisternal milk</b> and <b>foremilk sample</b> .
strip	To express milk from the teat using the hand.
strip cup	Cup fitted with a black surface or screen used for the examination of foremilk for the presence of clots, flakes, or other abnormal mammary secretions. An aid in the detection of clinical mastitis.
strippings	Milk left in the mammary gland following the completion of the milking. The more appropriate terminology is residual milk. Strippings, or residual milk, generally has a higher content of fat and somatic cells than composite milk from the entire milking. Compare <b>residual milk</b> .
subclinical	Disease process not detected by physical examination of the animal.
subclinical mastitis ( <i>preferred</i> ); pre-clinical mastitis	Inflammation of the mammary gland that is not visible and requires a diagnostic test for detection. The diagnostic test most used is measurement of milk somatic cell count. Subclinical mastitis is the most prevalent form of the disease.

subcutaneous	Under the skin.
summer mastitis	Form of mastitis characterized by thick, foul-smelling secretion (pus) usually caused by <i>Arcanobacterium pyogenes</i> and <i>Peptococcus indolicus</i> . The disease characteristically occurs in non-lactating animals and animals that have not yet given birth prior to first calving. Highest incidence of the disease is generally reported in summer months, particularly in areas of northern Europe.
supernumerary teats	Extra teats generally present on the rear of the bovine and caprine udder. Some of these teats open into a normal gland but many do not. A common management practice is to surgically remove such teats prior to one year of age.
surveillance	System or measurement technique to gain knowledge about a population by collection, analysis, and interpretation of data with a view to the early detection of cases of disease or changes in the health status of the population.
susceptibility	Likelihood that an animal can be infected or a term used to describe the fact that a bacterial isolate is killed or its growth inhibited by a given antibiotic.
suspensory ligaments	Tough connective tissue with a high collagen content that serves as the support system for the udder.
systemic	Distributed throughout the animal's body.
systemic therapy	Treatment of mastitis by treating the whole body not just the affected mammary quarter.
tandem parlor	Milking parlor with stalls arranged in-line on one or both sides of a pit. Entrance and exit may be automated, hence, auto-tandem.
TBC	See <b>total bacterial count</b> .
teat	Anatomical structure on the udder through which the milk must pass to reach the external environment. Milk enters the teat through the cricoid ring and exits through the streak canal.
teat canal	See <b>streak canal</b> .
teat canal penetrability	See <b>streak canal penetrability</b> .
teat cistern; teat sinus	Cavity within the teat where milk accumulates from the gland cistern.
teatcup	Part of the milking machine that is actually attached to the teat. Consists of the liner, shell, and may include a short pulse tube, a separate short milk tube and connector or sightglass.
teatcup jettets; jetter assembly	Assembly to which the teatcups are attached during cleaning to establish a connection from the washline or milking vacuum line to the teatcups.
teatcup plug	Plug or stopper to simulate the animal's teat and close off the mouthpiece of a teatcup for testing purposes.
teat damage	Loss of integrity of the teat.
teat dip	Germicide / disinfectant used to sanitize animals' teats.
teat dip bibliography	Summary of peer-reviewed publications on efficacy of premilking and post-milking teat disinfectants published since 1980. The bibliography is published and updated annually in the Proceedings of the NMC.
teat dipping	Act of dipping animals' teats in a teat dip following completion of the milking process. See also <b>pre-milking</b> and <b>post-milking teat disinfection</b> .
teat dip protocol	Research protocols developed by the NMC and published in the Journal of Dairy Science that provide methodologies for testing the efficacy of teat dips.
teat disinfection	Application of a germicide to animals' teats, generally post-milking. See also <b>teat dipping</b> .

teat duct	See <b>streak canal</b> .
teat induration	Chronic inflammation of the teat resulting in a change in teat tissue structure, composition, functionality, and a loss of elasticity and milkability.
teat impacts	Droplets or slugs of milk propelled against the teat end with sufficient force to penetrate part way into or sometimes through the streak canal.
teat lesion	Any localized, abnormal structural change such as an infection (warts, cowpox, etc.), injury or wound associated with the tissues of the teat.
teat massage	Squeezing action of the liner on the teat during the rest phase of pulsation. Teat massage is essential to prevent congestion of the teat tissue.
teat meatus	See <b>streak canal</b> .
teat patency	Term referring to the openness of the streak canal and the relative ease with which pathogens may invade the mammary gland. Often used to describe the likelihood of milk to leak after milk letdown and the rate of milk flow.
teat orifice	Distal opening of the streak canal.
teat reaming	See <b>keratin reaming</b> .
teat sealer	Product designed to physically prevent the entrance of microorganisms into the mammary gland through the streak canal of the teat. See <b>external teat sealer and internal teat sealer</b> .
teat sinus	See <b>teat cistern</b> .
teat sphincter	Smooth muscle surrounding the streak canal at the distal end of the teat and keeps the teat end closed when contracted.
teat spray	Disinfectant applied to teats by spraying.
teat spraying	The act of spraying animals' teats with a disinfectant before or after milking.
teat thickness	Maximum diameter of a teat, measured using calipers before and just after milking showing both the direction (plus or minus) and the extent of changes in the mass of fluid or other teat tissues compressed between the opposing jaws. These changes are mainly due to changes in degree of fluid accumulation in the teat tissue and to a lesser extent to changes in smooth muscle tone. See <b>Cutimeter</b> .
teat tissue	General term for all groups of cells (for example smooth muscle cells, epithelial cells, etc.) or specific tissues (connective tissue, blood vessels, etc.) which build up the teat.
teat tramp; stepped-on-teat	Physical injury to the teat caused by the animal stepping on her own teats or stepping on the teats of her herd mates.
therapy	Treatment of disease such as mastitis by some curative process.
tie stall; comfort stall	Type of stall for animals where they are tied individually in the stall by either a halter or neck collar, rather than a stanchion.
tie stall barn	See <b>comfort stall barn</b> .
tolerance	Concentration of marker residue in the target tissue which indicates that total residue in all edible tissues are at or below their safe concentration. Used in the US by FDA.
total bacterial count; TBC	See <b>standard plate count (SPC)</b> .
total confinement	A system of managing dairy cows where the cows are continuously maintained in barns or corrals with either no or limited access to pastures for grazing.
total dry cow therapy	See <b>blanket dry cow therapy</b> .

toxemia (US); toxaemia (UK)	Blood poisoning resulting from the presence of toxins.
toxin	Any poison produced by an organism such as bacteria that has patho-physiological effects.
transferrin	Blood protein that transports iron and is found in low concentration in milk. A whey protein whose origin is blood serum.
transient flora	Microorganisms present on teat skin that are the result of contamination and not colonization. The coliform organisms are examples of bacteria that can be found on teat skin but do not colonize teat skin.
treatment	Act of administering medication to an animal.
treatment cost	Monetary cost of a treatment for mastitis, comprising cost of antibiotics, veterinary fee etc.
true rate	Average speed at which the event of interest occurs per unit of animal time at risk. The exact calculation would be number of animals at risk which are diseased divided by sum of time period for each animal at risk within the study. Sometimes referred to as incidence density. Compare <b>incidence rate</b> .
udder	Two or more mammary glands enclosed in a layer of skin, characteristic of milking animals.
udder cistern	See <b>gland cistern</b> .
udder edema (US); oedema (UK)	Clinical term indicating the presence of edema in the udder and especially at the teat base which is often seen in animals before and after parturition.
udder pathogen	Any microorganism capable of infecting the mammary gland and causing mastitis. The term should be used in place of <b>mastitis pathogen</b> .
udder preparation	Act of preparing the animal for milking by cleaning the teats and udder and stimulating the milk ejection reflex.
udder quarter	See <b>quarter</b> .
ultrasound	Application of ultrasonic waves to therapy or diagnostics, as in imaging of internal structures. The ultrasound equipment used for pregnancy checks can also be used to determine changes in teats such as the effects of milking on teat width, cistern width, or teat length.
vacuum	Any pressure less than atmospheric pressure, specified as the reduction below ambient atmospheric pressure. Vacuum is normally expressed in inches or millimetres of mercury (i.e. 12 in Hg, 300 mm Hg) or kiloPascals (i.e. 40 kPa).
vacuum drop	Difference in average vacuum level between a downstream and an upstream point in a system, or any one point in a system before and after an increase in airflow into the system, other than through the vacuum regulator.
vacuum level	Difference between atmospheric pressure and the reduced pressure within the milking system. Two important vacuum levels are the milking vacuum and the nominal vacuum.
vacuum pulsator line	Pipe or line that supplies vacuum to the pulsator.
vacuum pump	Air pump that discharges air from the milking system and thus produces a partial vacuum.
vacuum pump capacity	Air moving capacity of the vacuum pump when it has attained working temperature, at a specified pump speed and vacuum level at the inlet, expressed in volume of free air per minute.
vacuum regulator; controller	Automatic device designed to control vacuum in the milk system and vacuum systems in order to maintain a constant vacuum level in the milking system.

viridians streptococci; green streptococci	Species of streptococci that produce alpha-hemolysis or a zone of greenish, discolored erythrocytes surrounding colonies growing on blood agar.
virulence	Degree of pathogenicity of a pathogen or the potential severity of the disease produced by an agent.
volatile fatty acids	Products of the fermentation of carbohydrates in the rumen. Acetic, butyric and propionic acids are the principle fatty acids used as an energy source by the animal.
walling-off	Condition in which microorganisms in the udder become enclosed (walled off) by scar tissue and may be less accessible to drugs. The process of abscess formation in the mammary gland.
washline	Pipeline which, during the cleaning process, carries cleaning and sanitizing solutions from the wash vat to the units, milkline or milking vacuum line.
weigh jar	See <b>recorder jar</b> .
weigh jar milking system	Milking system in which milk flows from the cluster into a recorder jar under vacuum from a milking vacuum line. Milk is discharged when required from the recorder jar either into a milk transfer line to a milk receiver or into a collecting vessel.
weighted mean	Sum of all figures multiplied by a corresponding amount value (kg milk) in an observed population divided by the sum of all amount values during the observation.
wet milking	Milking of teats and udders that have not been thoroughly dried prior to machine attachment. Also a hand milking technique where milk is sprayed on the hands to reduce friction.
whey protein	Protein left after the removal of the casein. The major whey proteins in bovine milk are beta-lactoglobulin and alpha-lactalbumin.
Wisconsin Mastitis Test; WMT	Indirect measure for milk somatic cells in which a sample of milk is mixed with a proprietary reagent in a special tube and the result read off from graduations on the tube.
withholding time	See <b>discard time</b> .
WMT	See <b>Wisconsin Mastitis Test</b> .
working vacuum	The mean vacuum measured at a stated test point for specified test conditions.
World Animal Health Organisation; OIE	Worldwide intergovernmental organization of veterinary authorities. (French: <i>Organisation Mondiale des Épizooties</i> ) Website: <a href="http://www.oie.int">www.oie.int</a>
yeast	Unicellular fungi that reproduce by budding and can be a cause of mastitis and are not susceptible to antibiotics commonly used to treat cases.
zero grazing	A system of pasture management where access to pasture could be difficult (e.g. weather) and freshly-harvested grass or other types of forage are fed to cows in a confined area.

**SUGGESTED INTERPRETATION OF MASTITIS TERMINOLOGY  
(REVISION OF BULLETIN OF IDF N° 338/1999)**

**ABSTRACT**

Guide to unambiguous usage of mastitis terms intended to minimize differences in usage in different English-speaking countries and thereby facilitate communication between mastitis specialists and users of mastitis data, bearing in mind the importance of mastitis in animal welfare and economics of milk production. Recent mastitis and other literature (IDF, Codex and other) has been reviewed to incorporate terms resulting from improvements in knowledge in the past 12 years.

*Keywords: mastitis, somatic cell count (scc), milk production, mastitis control, mastitis treatment, animal health.*

35 pp - English only

Bulletin N° 448/2011 - 40 Euro (electronic) - Date: 2011

# INTERNATIONAL DAIRY FEDERATION INSTRUCTIONS TO AUTHORS

## Submission of papers

Submission of a manuscript (whether in the framework of an IDF subject on the programme of work or an IDF event) implies that it is not being considered contemporaneously for publication elsewhere. Submission of a multi-authored paper implies the consent of all authors.

## Types of contribution

Monographs; separate chapters of monographs; review articles; technical and or scientific papers presented at IDF events; communications; reports on subjects on the IDF programme of work.

## Language

All papers should be written in English.

## Manuscripts

- Files to be sent electronically on CD-ROM, USB key or by e-mail.
- Final document in Word 2000 or later.
- All tables/figures included in final document to be sent also in separate Word, Excel or PowerPoint files, in colour format. Pictures to be sent in tif or eps format (resolution 300 DPI)
- All files to be named with author's surname plus title of paper/tables/figures.

## References

- References in the document to be numbered and placed between square brackets.
- Reference lists at the end of the document to contain the following:
  - \* Names and initials of all authors;
  - \* Title of paper (or chapter, if the publication is a book);
  - \* If the publication is a journal, title of journal (abbreviated according to 'Bibliographic Guide for Editors and Authors', published by The American Chemical Society, Washington, DC), and volume number;
  - \* If the publication is a book, names of the publishers, city or town, and the names and initials of the editors;
  - \* If the publication is a thesis, name of the university and city or town;
  - \* Page number or number of pages, and date.

Example: 1 Singh, H. & Creamer, L.K. Aggregation & dissociation of milk protein complexes in heated reconstituted skim milks. J. Food Sci. 56:238-246 (1991).

Example: 2 Walstra, P. The role of proteins in the stabilization of emulsions. In: G.O. Phillips, D.J. Wedlock & P.A. Williams (Editors), Gums & Stabilizers in the Food Industry - 4. IRL Press, Oxford (1988).

## Abstracts

An abstract not exceeding 150 words must be provided for each paper/chapter to be published..

## Address

Authors & co-authors must indicate their full address (including e-mail address).

## Conventions on spelling and editing

IDF's conventions on spelling and editing should be observed. See Annex 1.

## ANNEX 1 IDF CONVENTIONS ON SPELLING AND EDITING

In the case of native English speakers the author's national conventions (British, American etc.) are respected for spelling, grammar etc. but errors will be corrected and explanation given where confusion might arise, for example, in the case of units with differing values (gallon) or words with significantly different meanings (billion).

"....."	Usually double quotes and not single quotes
? !.....	Half-space before and after question marks, and exclamation marks
± .....	Half-space before and after
microorganisms.....	Without a hyphen
Infra-red.....	With a hyphen
et al.....	Not underlined nor italic
e.g., i.e.,... ..	Spelled out in English - for example, that is
litre.....	Not liter unless the author is American
ml, mg,... ..	Space between number and ml, mg,...
skim milk.....	One word if adjective, two words if substantive
sulfuric, sulfite, sulfate.....	Not sulphuric, sulphite, sulphate (as agreed by IUPAC)
AOAC <u>International</u> .....	Not AOACI
programme.....	Not program unless a) author is American or b) computer program
milk and milk product.....	rather than "milk and dairy product" - Normally some latitude can be allowed in non scientific texts
-ize, -ization.....	Not -ise, -isation with a few exceptions
Decimal comma.....	in Standards (only) in both languages (as agreed by ISO)
No space between figure and % - i.e. 6%, etc.	
Milkfat.....	One word
USA, UK, GB.....	No stops
Figure.....	To be written out in full
1000-9000 .....	No comma
10 000, etc. ....	No comma, but space
hours.....	ø h
second.....	ø s
litre.....	ø l
the Netherlands	

Where two or more authors are involved with a text, both names are given on one line, followed by their affiliations, as footnotes

for example A.A. Uthar<sup>1</sup> & B. Prof<sup>2</sup>

<sup>1</sup> University of .....

<sup>2</sup> Danish Dairy Board .....

IDF does not spell out international organizations



INTERNATIONAL DAIRY FEDERATION / FEDERATION INTERNATIONALE DU LAIT  
Boulevard Auguste Reyers, 70/B - 1030 Brussels (Belgium) - <http://www.idf.org>