Food Safety

Fact Sheet: Milk and Meat Quality and Safety Troubleshooting Guides

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These guides are meant to identify corrective actions when a problem occurs. Within the guides are references to other chapters within the Reference Manual where additional information can be found.

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Troubleshooting Antimicrobial and Other Residues in Milk and Dairy Beef

CAUSES	SOLUTIONS
Milk from treated animals enters bulk tank or animals are shipped for slaughter before end of withdrawal time: • No permanent written records of treatments • Forgetting animal was treated • Poor identification of treated animals • Poor communication between person who treated and person who milks or ships animals • All milk from all quarters of treated animal not kept out • Milkline used as a vacuum source to milk treated animal when using trap bucket to withhold milk • Separate milker unit for treated animals not used • Milker unit not cleaned properly between treated and untreated animals • Dry and treated animals not separated from the milking herd • Withdrawal times not followed	☐ Keep a permanent record of all treatments - **see Workbook** for examples ☐ Mark all treated animals in an easily recognized manner ☐ For Automatic Milking Systems (AMSs), enter livestock medicine treatments into the computer **before** you treat the animal ☐ Post treatment information on a message or bulletin board to ensure people milking are aware of treated animals and appropriate withdrawals ☐ Discard milk from all quarters of treated animals ☐ Check with equipment supplier to see whether present pulsator can be adapted to provide vacuum to trap bucket ☐ Milk treated animals last or with separate equipment to ensure no contaminated milk can enter the milk supply ☐ Check all cull animals records before shipping to ensure withdrawal dates are met ☐ Thoroughly clean milker unit between treated and untreated animals ☐ Use antimicrobial test where appropriate ☐ Separate dry cows from the milking herd ☐ Follow label directions and withdrawal times or written veterinary directions for extra-label drug use

CAUSES	SOLUTIONS
Prolonged drug withdrawal time because antimicrobials used in extra-label fashion: • Antimicrobial drugs used at a higher dosage and/or more frequently than label instructions • Livestock medicines administered by a route different from label recommendations • Antimicrobial drugs not approved for use in lactating dairy cattle are used • Use of two antimicrobials for treatment at the same time	☐ Make a permanent record of all treatments - **see Workbook** for examples ☐ Use only approved livestock medicines, and use only according to label instructions or according to a veterinarian's directions for use. ☐ Use appropriate antimicrobial tests ☐ Obtain written veterinary directions for use for all extra label treatments including when multiple antimicrobials are used at the same time
• Purchasing cattle that have been treated	☐ Obtain a letter of guarantee from the previous owner outlining the treatments administered to the cattle or test the milk from the purchased cattle and ensure it passes the official provincial regulatory test before shipping the milk
• Dry cows that have been dry-treated calve earlier than withdrawal time on label	☐ Confirm date of dry-off treatment of freshened cattle to determine whether adequate withdrawal time has been observed ☐ Consult your herd veterinarian for advice on appropriate withdrawal times ☐ Use antimicrobial test kits where appropriate
• Feeding medicated feeds	☐ Medicated feeds for non-lactating dairy cattle should be stored separate from the milking herd feeds ☐ Remove all traces of medicated feed from storage and feed handling equipment
• Animals' udders treated with antimicrobial ointments, salves and sprays	☐ Use only approved products ☐ Follow recommended withdrawal times
• Antimicrobial residue being secreted even after the approved withdrawal time is observed	☐ Check all treated animals with an appropriate test
• Foot baths and foot treatments used to combat infectious diseases of the feet	☐ Use according to label directions or written veterinary directions for extra-label drug use. See Chapter 5, Section 5.3 for more details.

For more information on preventing residues in milk and meat, see Chapters 5, 6 and 9.

Troubleshooting High Bacteria Counts

CAUSES	SOLUTIONS
a. MILK COOLING • Improperly adjusted or malfunctioning thermostat • Inaccurate or malfunctioning thermometer • Improperly working or sized pre-cooler • Inadequate milk volume on first milking for proper agitation • Slow / inadequate agitation • Cooler not turned on for first milking • Inefficient cooling to greater than 0°C and less than or equal to 4°C (34°F to 40°F) ⇒Takes >2 hours after 1st milking and >1 hr after 2nd and subsequent milkings ⇒Blend temperature rises above 10°C (50°) during 2nd and subsequent milkings	☐ Adjust, replace or calibrate thermostat ☐ Adjust, replace or calibrate thermometer ☐ Call service dealer ☐ Check if service dealer can adjust paddle (this can be problematic, as most tanks have established minimum volumes for proper agitation. Lowering agitator may not meet tank's specifications.) ☐ Change bulk tanks ☐ Review pre-milking practices ☐ Check cleanliness of condenser radiator on a regular basis and clean as needed ☐ Ensure proper ventilation for condenser radiator ☐ Check refrigerant level ☐ Call service dealer for assistance ☐ Check cooling and sanitation — **see Chapter 7** ☐ Install a pre-cooler unit
b. MILKING MANAGEMENT • Dirty hands • Unclean teats/udders • Milking area floors unclean during milking • Unit drop-offs during milking	☐ Ensure hands are clean before and during milking ☐ Wear nitrile/latex gloves ☐ Review udder preparation — **see Chapter 6** ☐ Manage manure properly — **see Chapter 1** ☐ Restrict animal access to unclean areas ☐ Adequate stall sizes ☐ Adequate bedding and proper stall maintenance ☐ Check cattle environment: outdoors and indoors — **see Chapter 1** ☐ Wash dirty units if/when they have fallen ☐ Keep floors as clean as possible at all times ☐ Check milking equipment — **see Chapter 8** ☐ Call service dealer

CAUSES	SOLUTIONS
Sections C, D and E (below) GENERAL UNCLEAN MILK CONTACT SURFACES	☐ **See information below and Chapter 8** ☐ **See sample records in Workbook**
c. WASH SYSTEM ANALYSIS • Incorrect wash charts ⇒not enough chemicals to properly clean equipment • Unclean CIP milk contact surfaces • Wash sink drain not closing properly	☐ Have the service dealer update the chart and have it posted in the milk house ☐ **See Section D below and Chapter 8** ☐ Call service dealer
d. WASH CYCLE ANALYSIS 1. Pre-rinse • Start and/or end temperatures are too low 2. Wash • pH is not between 11.0 to12.0 • Chlorine concentration below 75 PPM • Starting temperature too low • Ending temperature too low • Circulation time too long or too short • Water volume too low — milker units or intake pipe 'suck air' in wash sink 3. Acid rinse • Starting and ending pH >3.5 4. Pre-milking sanitize	1. Pre-rinse ☐ Ensure water heater is adjusted and working properly ☐ Ensure start temperature is 35 to 60°C (95 to 140°F) ☐ Ensure end temperature is no less than 35°C (95°F) 2. Wash ☐ Have chemical supplier/service dealer test pH ☐ Have chemical supplier/service dealer test chlorine PPM ☐ Ensure start temperature is 71°C (160°F) ☐ Ensure ending temperature is no lower than 43°C (110°F) ☐ For tie stall/stanchion barn systems - check posted wash chart — generally 5 to 10 minutes is time needed manual water fill: fill sink so milker units have at least 2 to 3 inches of water over the teat cups at all times ☐ CIP water fill: call service dealer to adjust water volume 3. Acid rinse ☐ Ensure pH is less than 3.5 — have chemical supplier/service dealer test pH ☐ Ensure water temperature complies with manufacturers' recommendations as posted on wash chart (some acids use cold water) 4. Pre-milking sanitize ☐ Ensure temperature is 43°C (110°F)

CAUSES	SOLUTIONS
• Starting temperature is incorrect • Chlorine concentration is too low 5. Equipment function • Equipment not functioning properly for proper cleaning, e.g., poor "slugging" action • Poor system design e.g. dead ends • Slow sink fill time	☐ Ensure starting concentration is 200 ppm — have chemical supplier/service dealer test ppm level 5. Equipment function ☐ Call service dealer for performance check ☐ Have an thorough, annual equipment maintenance check ☐ Ensure minimum 20 slugs/wash with a flow rate of 7-10 m/sec or 23-33 ft./sec ☐ Check for air leaks in pipeline and inlets (loss of temperature and slugging) ☐ **See Chapter 8** ☐ **See Workbook**
e. MANUAL WASH • Milk surfaces are not clean • Not all cleaning cycles completed (pre-rinse, wash, acid rinse and sanitize) • Not enough chemicals used • Improper cleaning chemicals used • Worn out cleaning brushes • Milk residue allowed to dry on milk contact surfaces	☐ **See Chapter 13 "Films and Deposit"** ☐ Perform all cycles for proper cleaning ☐ Refer to wash chart — **see sample in Workbook** ☐ Use only approved dairy cleaners and sanitizers ☐ Replace as recommended by service dealer ☐ Wash bulk tank immediately after milk is removed ☐ Wash milking system immediately after milking
f. WATER QUALITY • Non-potable water used	☐ Use only potable water ☐ Have a water sample taken to check for bacteria levels — **see Chapter 8** ☐ Take water sample directly from tap (remove hose before taking sample)
g. EQUIPMENT • Worn/deteriorated liners/rubber parts	☐ Abide by a strict change schedule ☐ Use cleaning chemicals according to manufacturers' recommendations

Troubleshooting Films and Deposits on Equipment

FILM OR DEPOSIT	DESCRIPTON	CAUSE	REMOVAL	PREVENTION
Mineral, calcium, magnesium	• White (water-stone), chalky to gray	• Improper rinsing • Dropout of minerals from water supply • No acidified rinse	• Acid wash with hot water (double up on label rate)	☐ Use acid rinse regularly ☐ Make sure that alkaline product used has good water-conditioning properties ☐ Use water softener
Iron	• Brown to red	• Water supply • Aggressive supply system components • No acidified rinse	• Acid wash with hot water	☐ Use regular effective acid rinse ☐ Treat water ☐ Properly select sanitizers
Inking (blacking)	• Black rubber parts	• Reaction between chlorine or chlorinated compound and rubber	• Acid wash with hot water—if not removed, replace	☐ Use acid rinse ☐ Ensure proper dry storage ☐ Chlorine overuse
Black	• Black residue deposit	• Rubber migration • Contact of dissimilar materials	• Acid wash with hot water—if not removed, replace	☐ Use acid rinse ☐ Ensure proper dry storage ☐ Chlorine overuse
Protein	• Blue– rainbow hue, varnish like apple sauce	• Using non-chlorinated cleaner • Inadequate pre-rinse • Improper (sporadic or periodic) cleaning • Too hot pre-rinse	• Initial clean-up with equal parts of chlorine and a chlorinated alkaline detergent with hot water—double up on label usage rate	☐ Use a chlorinated alkaline detergent ☐ Clean with appropriate dilution during each cleaning cycle ☐ Adequately pre-rinse with warm (38° to 43°C or 100° to 110°F) water ☐ Pre-rinse before milk film dries on equipment surfaces
Milkstone or waterstone	• White to yellow	• Mineral from milk • Mineral from water • No acidified rinse	• Initial clean-up with a chlorinated alkaline detergent with hot water—double-up on label usage rate • Acid wash	☐ Use regular and proper cleaning procedures coupled with acid rinse ☐ Use a periodic acid wash in addition to the normal cleaning cycle

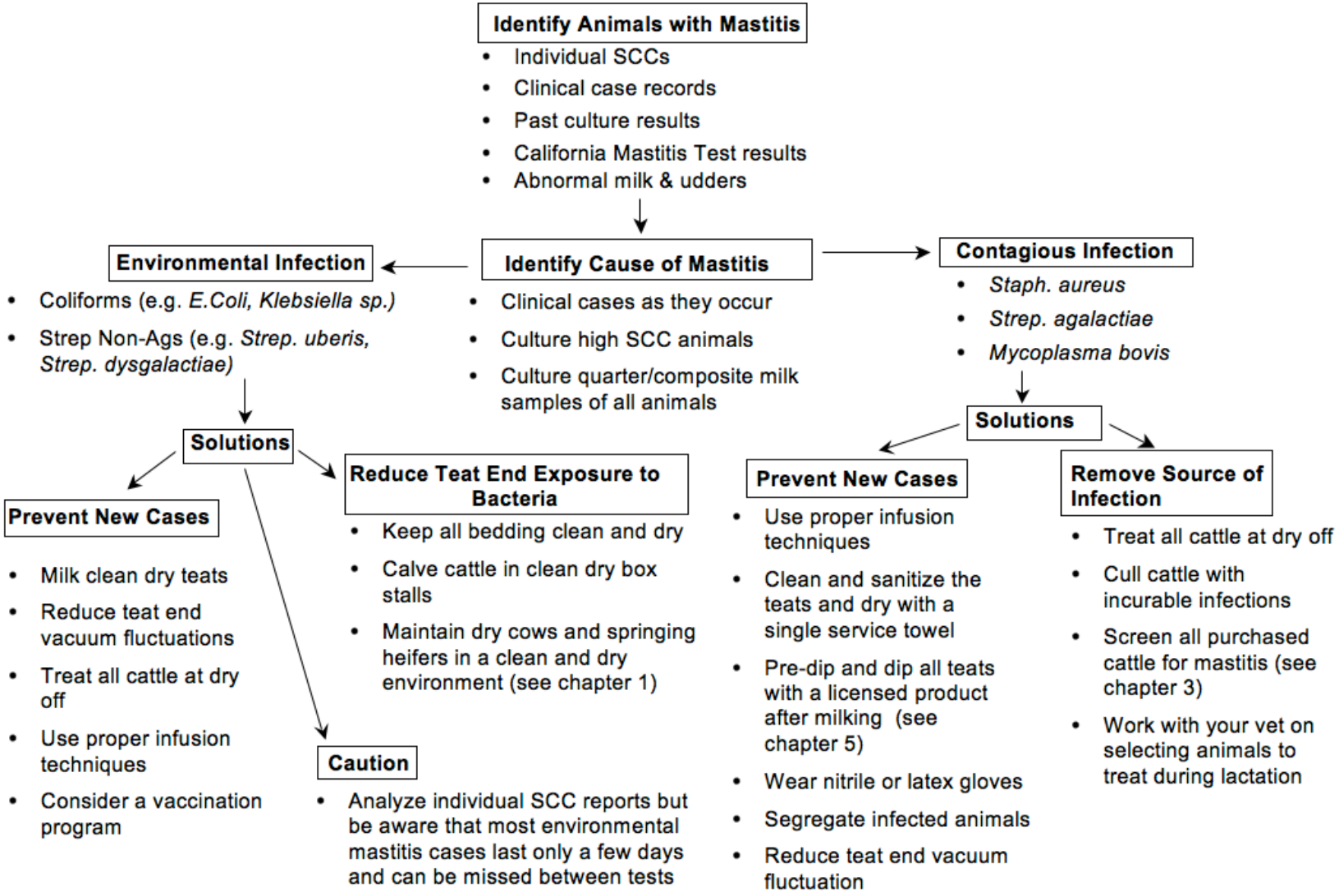
FILM OR DEPOSIT	DESCRIPTON	CAUSE	REMOVAL	PREVENTION
Fat/grease	• Hanging water droplets with greasy (white) appearance • Oil	• Improper pre-rinse (cold water) temperatures • Low final temperature during cleaning cycle • Improper detergent concentration • Regular use of acids during washing cycle • Pulsator oil on equipment surface	• Initial clean-up with a chlorinated alkaline detergent with hot water — double up on label usage rate	☐ Use regular and proper cleaning procedures, coupled with acidified rinse ☐ Use warm (38°C to 49°C or 100°F to 120°F) pre-rinse water ☐ Properly clean with proper use of dilution during each cleaning cycle ☐ Ensure wash water does not drop below 43°C or 110°F
Factory soil	• Grease, factory dirt-black deposit, rusting	• Improper or no initial clean-up	• Initial clean-up with equal parts of chlorine and a chlorinated alkaline detergent with hot water — double label rate	☐ Thoroughly clean equipment before using it initially
Corrosion	• Rust, pitting	• Iron, tramp metal particles, improper chemical usage	• Acid wash and abrasive action • Re-polishing (buffing) if advanced corrosion	☐ Use proper cleaning procedures and passivating acid
Etching	• Pitted and white discolouration 'imbedded' in stainless steel surface	• Improper use of chemicals	• Re-polish	☐ Use proper cleaning procedures and passivating acid rinse
Plastics —				
Opaque	• Foggy, white not clear	• Improper draining, moisture absorption	• Exposure to heat and/or sunlight	☐ Use blower or dryer ☐ Ensure good drainage
Yellow	• Yellow colour	• Old age, improper use of iodophors, hand soil stain	• None	☐ Apply product properly
Brown, black	• Brown discolouration	• Rubber migration, carbon from dryer motors	• Acid wash — if not removed, replace	☐ Use acid rinse regularly ☐ Use proper filtration

FILM OR DEPOSIT	DESCRIPTON	CAUSE	REMOVAL	PREVENTION
				☐ Segregate plastics and rubber
Red	• Red colour, stain	• *Serratia marcescens*	• None	☐ Use proper cleaning procedures regularly
Pink, purple	• Pink to purple colour	• Streptococcus *rubriticuli*	• Strong alkaline wash	☐ Use proper cleaning procedures regularly

Films and deposits are caused in part by poor procedures (improper cleaning, rinsing, etc.) and by incompatible products. In mechanical cleaning, problems may also be due to malfunction of the system or lack of proper solution control.

Source: The Professional's Approach to Quality Milk Production. Dr. David Reid and Dr. Andy Johnson, 1993.

Troubleshooting Mastitis and High Somatic Cell Counts



NOTE: For more information on management practices for preventing and controlling mastitis see Chapters 1, 4, 6.