Practical considerations to reduce carry-over in design of recording and sampling devices

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Practical Considerations to Reduce Carry-Over in Design of Recording & Sampling Devices

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What Carryover?

- Colostrum
- Milk
- Water and/or cleaning agents
- External contamination

Opportunities for Residue?

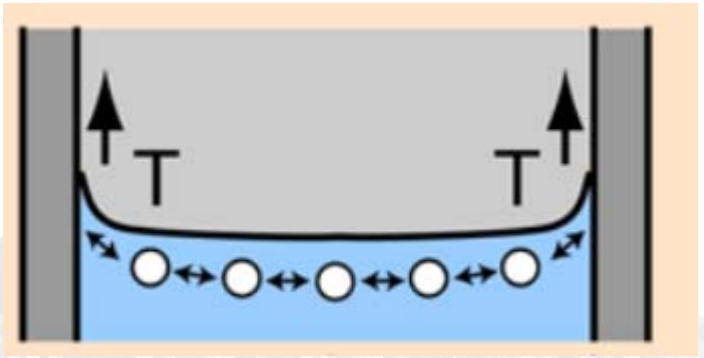
Fullwood

Does Backflush Help??

Milk - Physical Properties

- Physically, milk is a rather dilute emulsion combined with a colloidal dispersion in which the continuous phase is a solution. Its physical properties are similar to those of water but are modified by the concentration of solutes and by the state of dispersion of the other components.

- It is “Sticky”



Surface Tension of Milk, Water and a Plastic

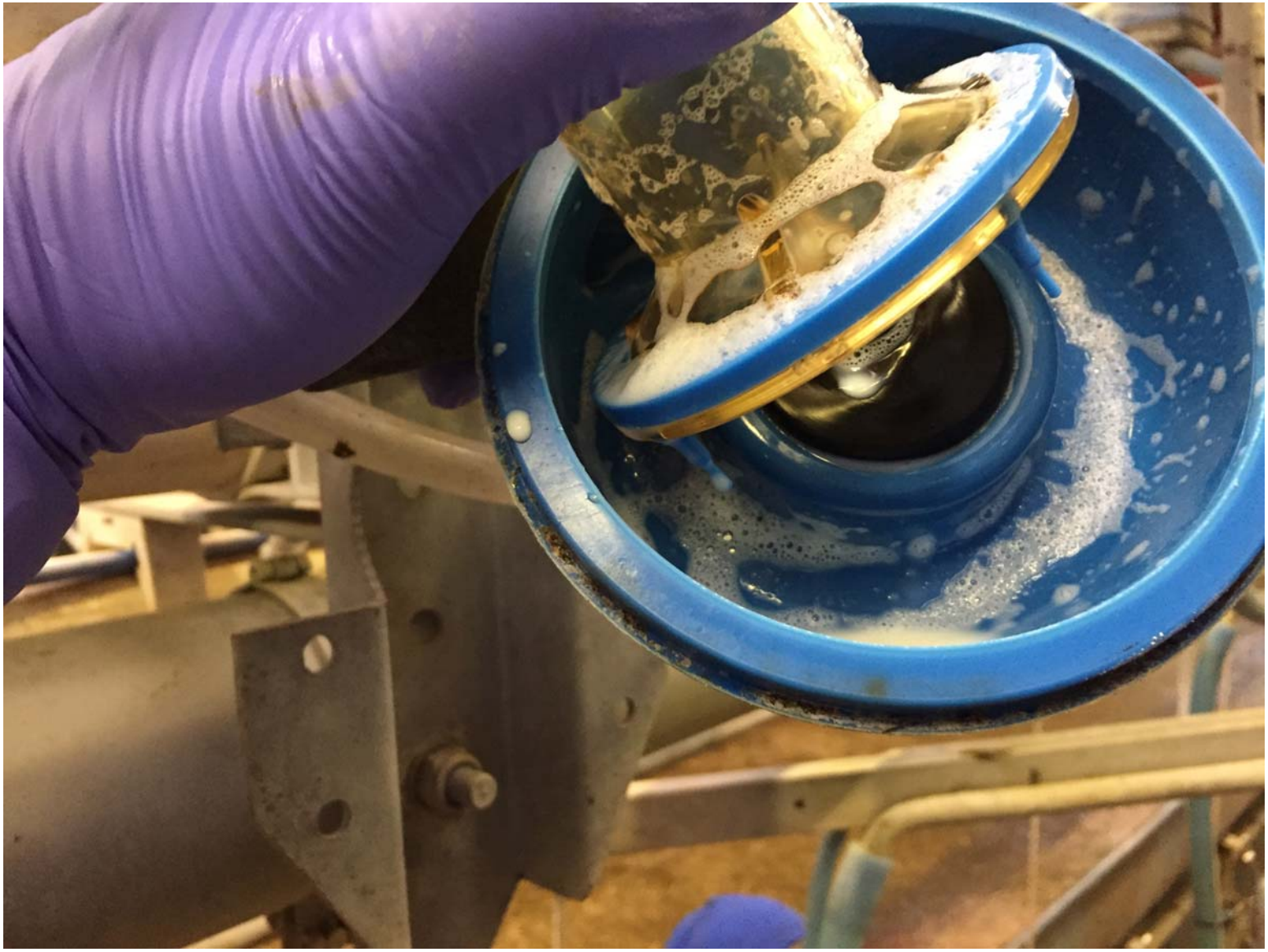
(dyn/cm at 20°C)

Raw Milk	49-51
Cream	42-45
Water	72.8
Polysulphone	42.1

How Much Carryover per Milking Unit?

Claw + Long Milk Tube 80 – 160ml
Plus Milk Meter 0 – 20 ml

Sticky Milk Residues



Significance of Carryover - Fat

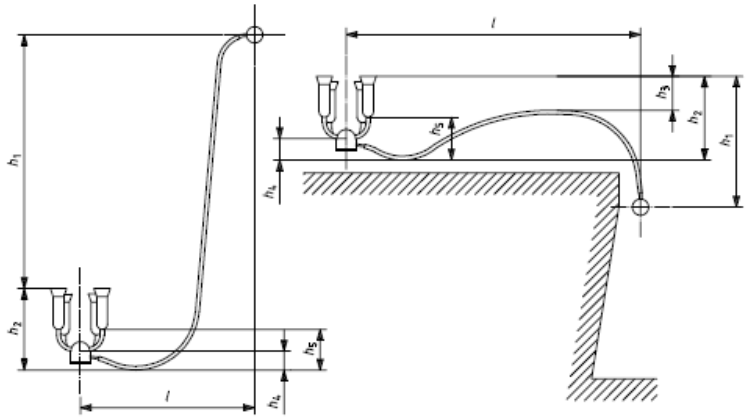
Carryover	Fat	Carryover
gm milk	%	gm fat
50	8	4
100	8	8
160	8	12.8

Significance of Carryover - Fat

Yield	Fat	Fat	50 gm		160 gm	
kg	%	gm	gm Fat	%	gm Fat	%
2	4	80	84	4.2000	92.8	4.6400
5	4	200	204	4.0800	212.8	4.2560
10	4	400	404	4.0400	412.8	4.1280
15	4	600	604	4.0267	612.8	4.0853
20	4	800	804	4.0200	812.8	4.0640

Colostrum?
Antibiotic Residue?
Micro-organisms??

Internal Surface Area (to point of sample extraction)



Conventional Milking Unit

0.33 - 0.45 m^2

Automatic Milking Unit

1.27 m^2
(not including sampler)

ISO5707:2007 Construction of Equipment

Milking equipment and connection to milk storage facilities on the farm should be designed and maintained to minimize turbulence, frothing, foaming or agitation of the milk, thereby reducing physical damage to the milk fat and the development of free fatty acids.

All milk contact surfaces shall be free from engraving or embossing. All metal milk contact surfaces, except for welded seams, shall have a surface roughness, Ra, less than or equal to 2,5 µm when tested in accordance with ISO 4288. Surface roughness, Ra, on welded seams shall not exceed 16 µm.

Materials that come into contact with cleaning and disinfecting fluids at concentrations of normal use shall be suitable for such contact. Materials that also come into contact with milk shall be resistant to both milk fat and cleaning and disinfecting solutions.

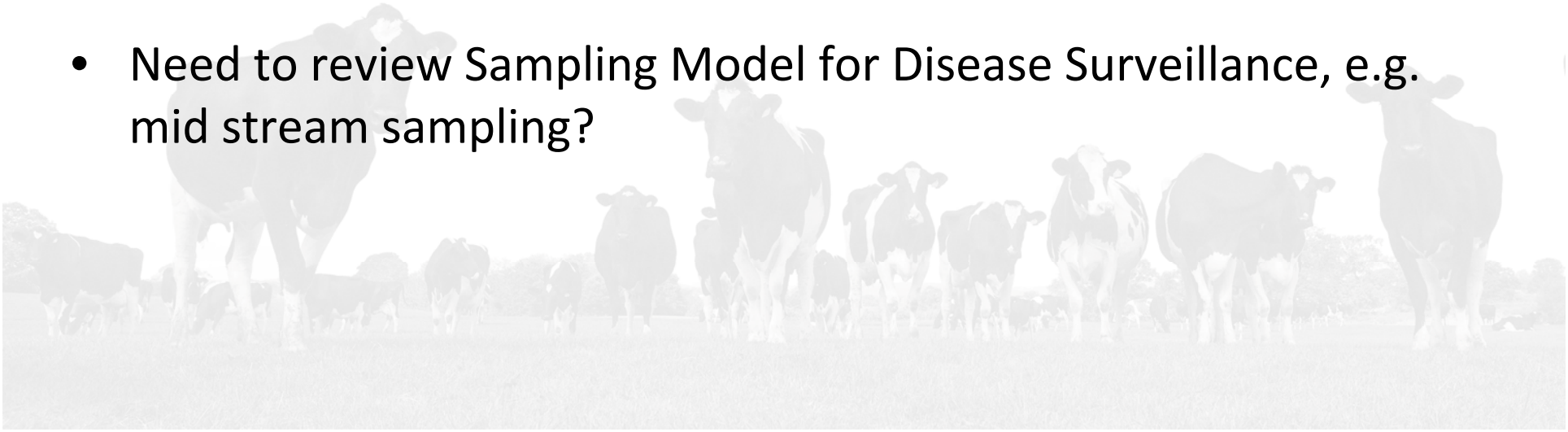
Practical Steps to Reduce Carryover

- End of Milking - Valve Dump
- Milk Sweep
- Eliminating Non-Draining Milk Tubes

- Material Choice??

Conclusions

- Carryover is unavoidable
- Effect on Fat Content may or may not be significant
- Traditional Sampling Model driven by need for fat accuracy
- What about Disease Surveillance and Pathogen Recognition?
- Need to review Sampling Model for Disease Surveillance, e.g. mid stream sampling?



Thank You