AMS CARRY OVER TESTING PROTOCOL
–
SUGGESTION FOR ICAR

Peter Løvendahl, Martin Bjerring,
Torben Larsen, Harrie van den Bijgaart
and Christian Baumgartner

Joint effort

- ICAR task force group
- 3 institutions
  - *Dept. of Molecular Biology and Genetics and Dept. of Animal Science, Aarhus University, Denmark*
  - *Qlip N.V., Zutphen, The Netherlands*
  - *Milchpruefring Bayern e.V., Wolnzach, Germany*

What is carry over?

.. that a milk sample from cow B also contains some milk from cow A that was milked just before B

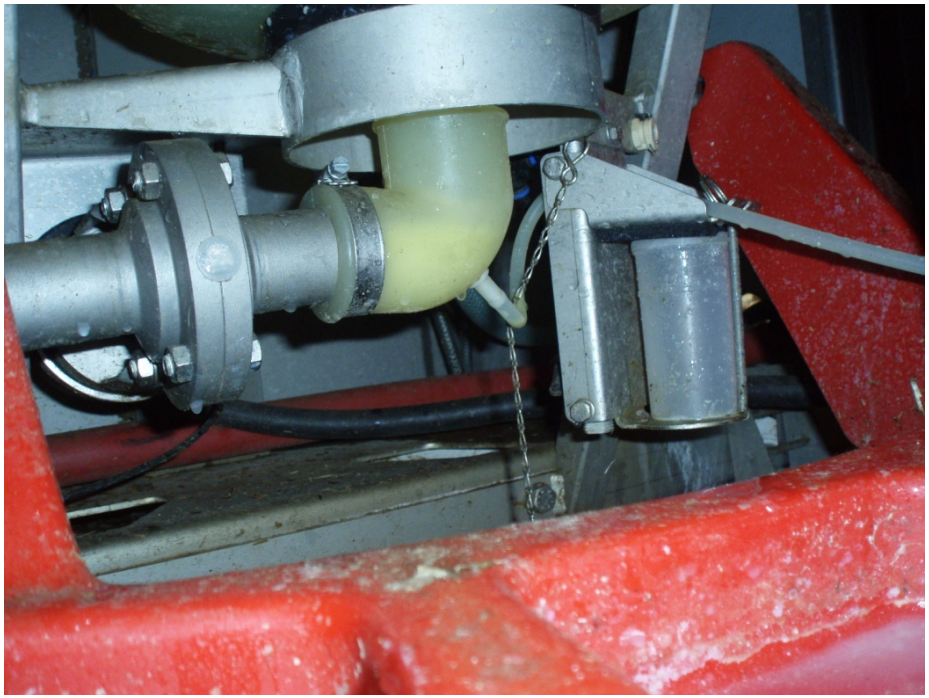
.. samples obtained from AMS are more prone to carry-over because of:

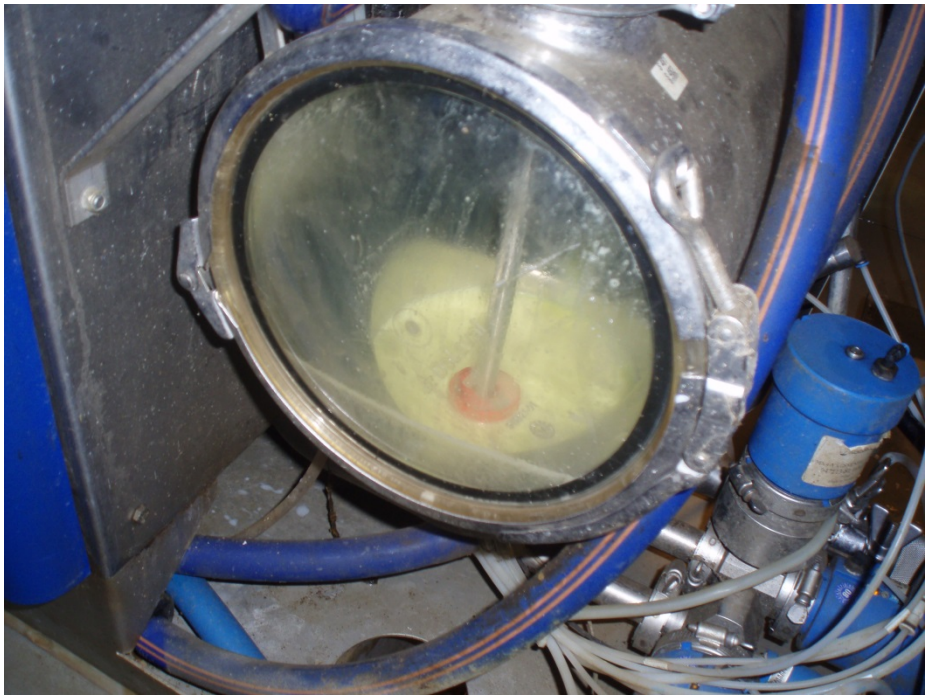
greater complexity of AMS …

valves, pumps, tubes, containers etc.

Visible carry-over

Imperfect emptying of recorder / end-unit





Testing methods

ALWAYS on complete system: Cow to sample

- Statistical
  - correlation / regression to previous sample content
- Bench-Herd test – **tracer dilution method**
  - **Phantom** cow milkings
  - **Live** cow milkings

Fluorescent colour tracer

.. How much **yellow** goes into **white** milk ?

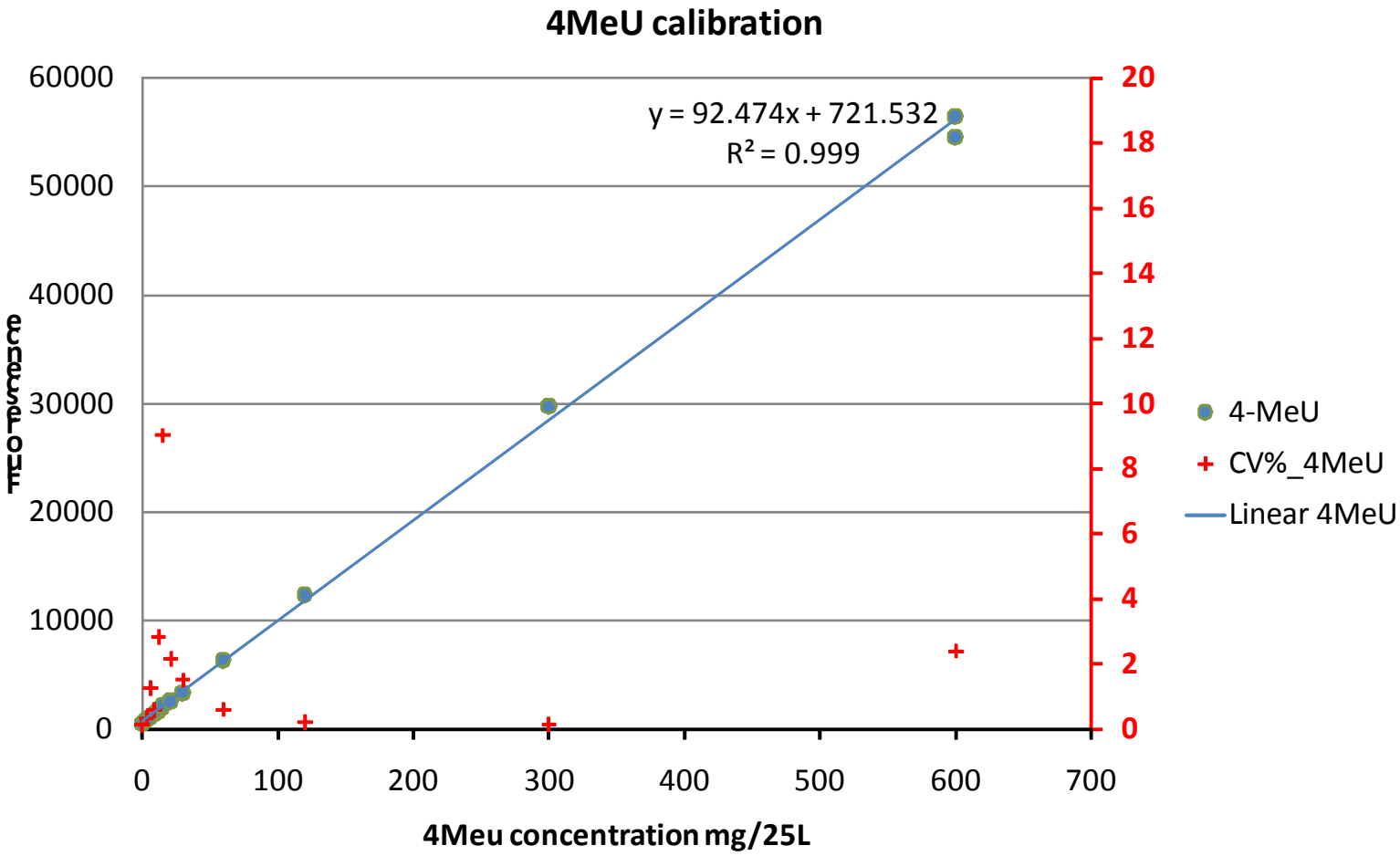
Two fluorescent tracers are mixed into milk

- Fluorescein
- 4MeU - (4-Methyl Umbelliferon Sodium salt)
- 600 mg / 35 L
- Mixes well with water and fat
- (non-harmful when diluted in this way) BUT:

DISCLAIMER

We take absolutely no responsibility of any sort for violations of any national or local regulations on food safety or similar from using this testing protocol.

Linear calibration curves with low CV



Testing protocol - steps

- Collect bulk milk for testing – 200 L
- Split in White and Tracer
- Throughly mix tracer colours into TRACER milk
- Weigh out portions of White and Tracer
- Keep milk warm / temperated
- Take samples before and following ”milking” with phantom cows
- Read / Analyze samples using fluorometer

AVOID BRONOPOL – interference possible

Then we were almost ready …

Testing protocol - tubes

- Each series contains 4 ”milkings”, 2 yellow + 2 white
- Extra sample points can be inserted – e.g. recorder unit

Series	Content	Milk in	Bucket	Sampler
		Kg	Sample_ID	Sample_ID
1.1	Yellow	*6*	11.1	11.2
1.2	Yellow	*6*	12.1	12.2
1.3	White	*6*	13.1	13.2
1.4	White	*6*	14.1	14.2
2.1	Yellow	*10*	21.1	21.2
2.2	Yellow	*10*	22.1	22.2
2.3	White	*10*	23.1	23.2
2.4	White	*10*	24.1	24.2
3.1	Yellow	*16*	31.1	31.2
3.2	Yellow	*16*	32.1	32.2
3.3	White	*16*	33.1	33.2
3.4	White	*16*	34.1	34.2

Milking Phantom cows

Cheat codes and ID-tags needed!

Example – calculated C-O

Series	Cont.	*Bucket*			*Samp.*			Ratios	
			Fluresc	4MeU		Fluresc.	4MeU	Fluresc.	4MeU
1.1	Yellow	*11.1*	610,6	597,4	*11.2*	542,5	539,8	542,5/610,6 = 0,89	539,8/597,4 = 0,90
1.2	Yellow	*12.1*	620,4	605,0	*12.2*	606,1	600,5	606,1/620,4 = 0,98	600,5/605,0 = 0,99
1.3	White	*13.1*	-3,9	-0,2	*13.2*	61,7	56,9	61,7/606,1 = 0,102	56,9/600,5 = 0,095
1.4	White	*14.1*	-0,4	0,6	*14.2*	0,5	4,6		

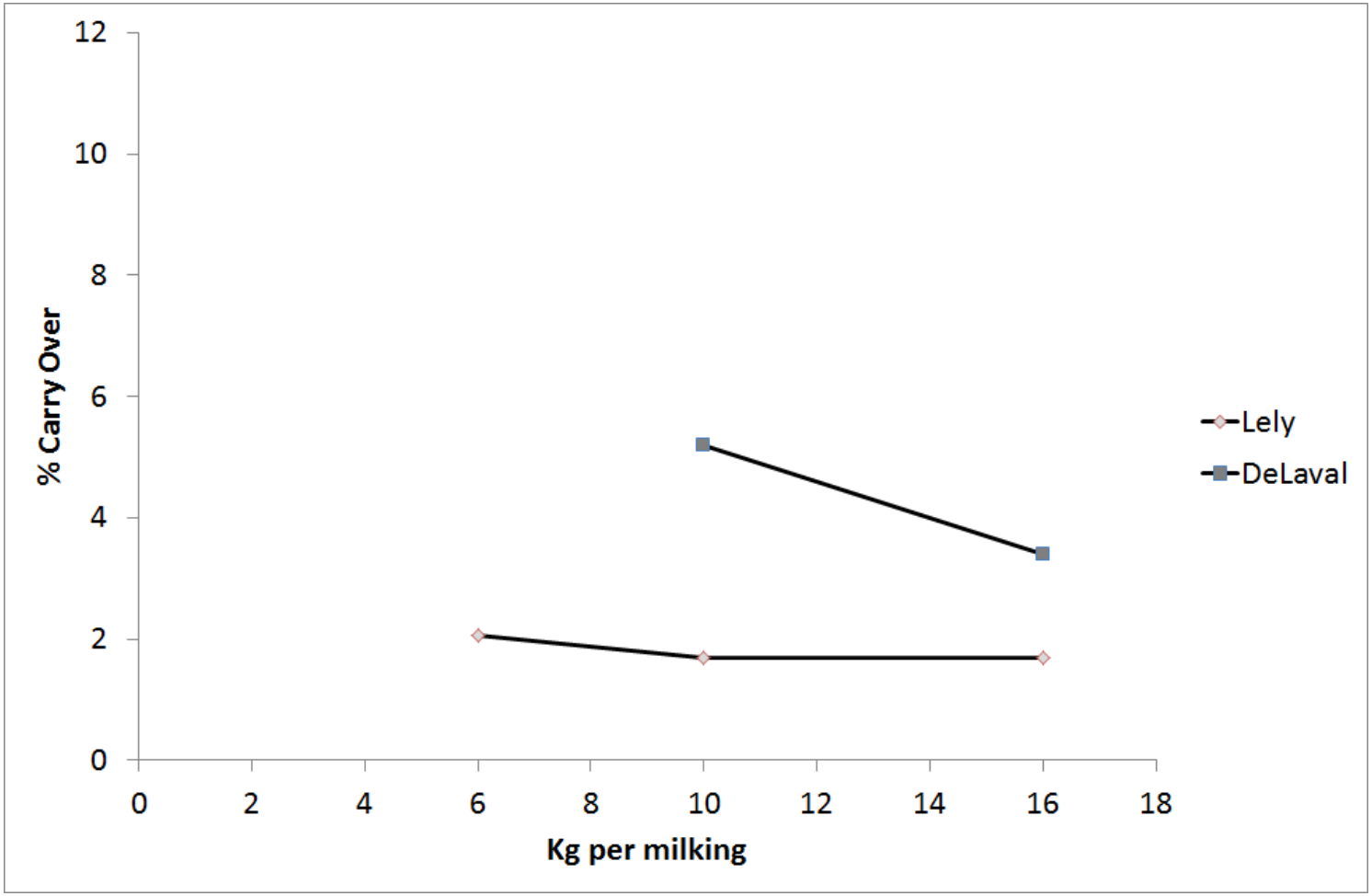
So, we calculate 100*(0.5*(0.102 + 0.095)) = **9.9% carry over**

Examples from actual tests

Equipment	*Date*	*Milk kg*	*N*	*C-O %*
TruTest-Parlor	2010	8	6	**3.4 %**
AMS-L	2008	5, 8	6	**14.5 %**
	2009	6, 8	7	**2.5 %**
	2013	6, 10, 16	3	**1.8 %**
VMS-DL	2008	5	1	**8.5 %**
		8	3	**2.9 %**
	2010	8	6	**6.9 %**
	2013	10, 16	2	**4.3 %**

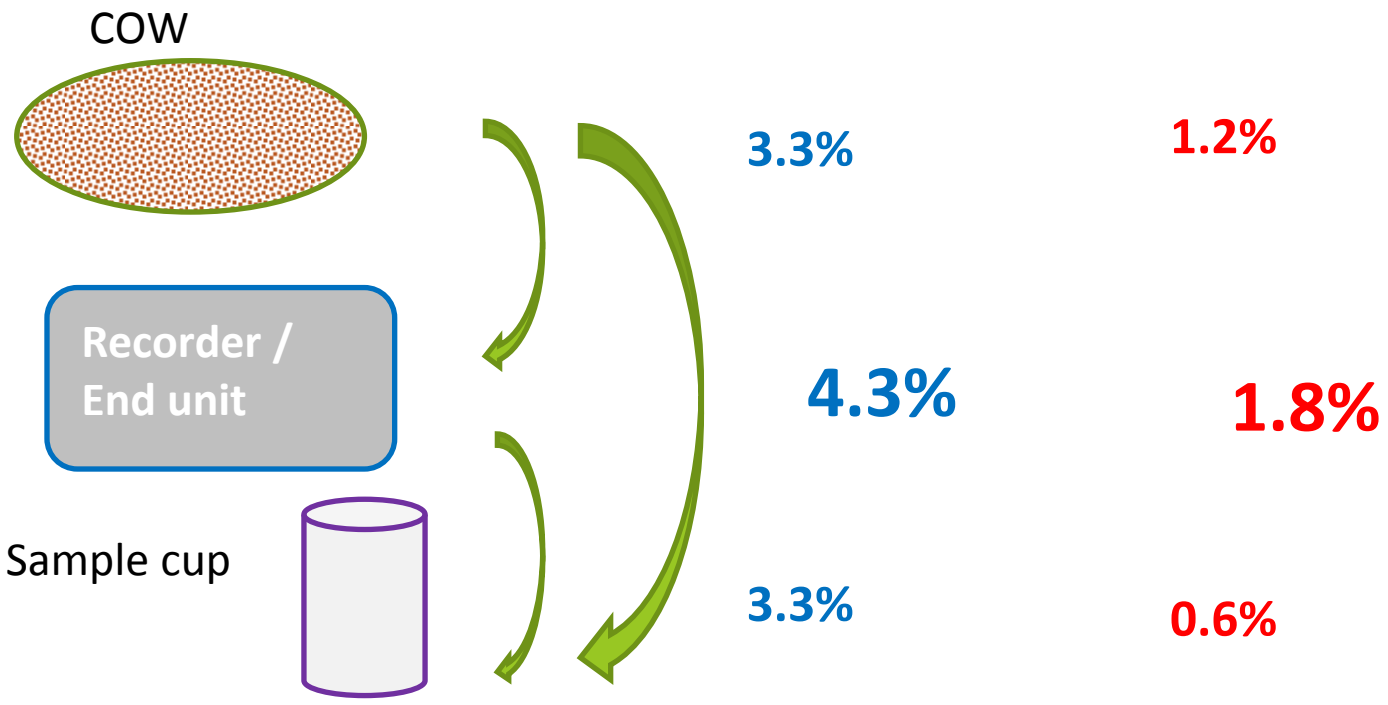
Is carry over affected by yield?

- CO – volume profiles – example findings



Splitting the C-O into device parts

By taking in **extra sampling points** – useful as diagnostic tool – where is C-O generated?

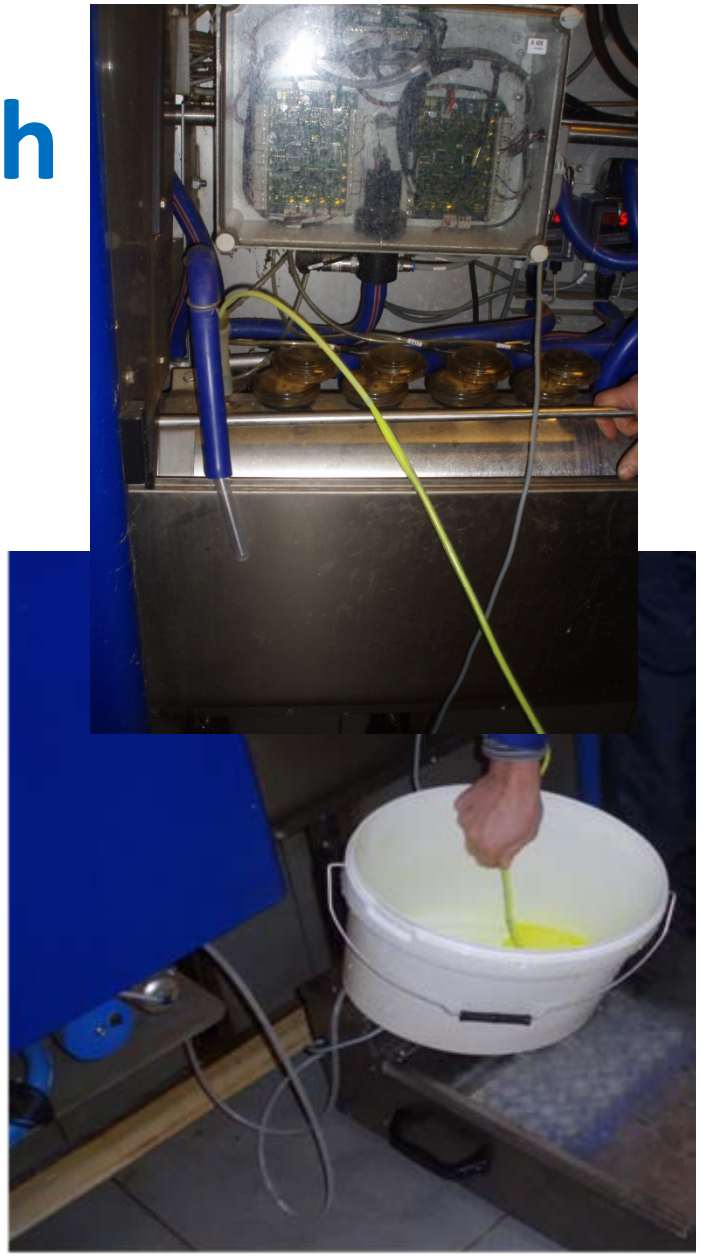


Live cow approach

Phantom cow method closes the AMS for 2-3 hours –

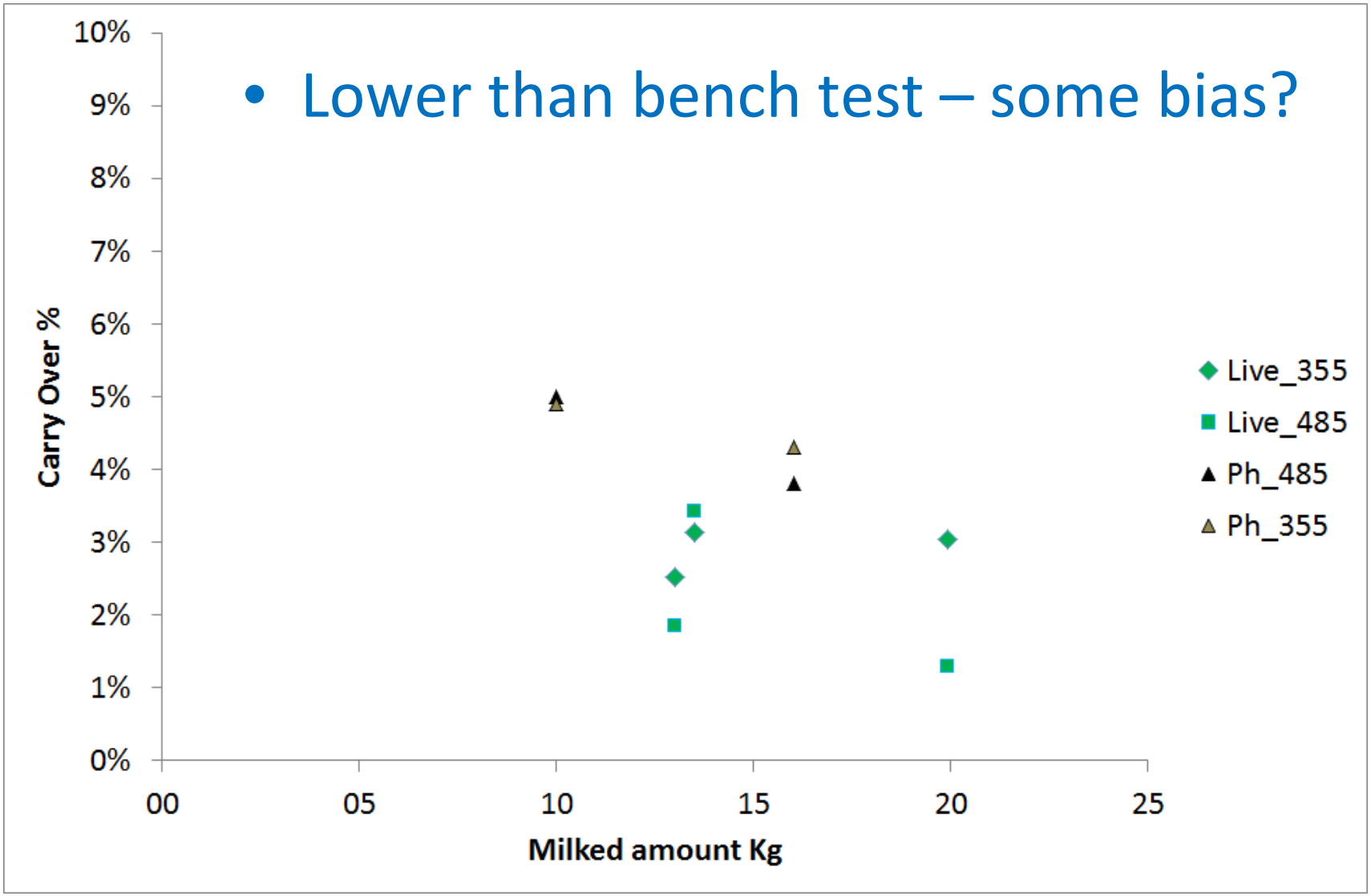
Alternative without closing?

>> *Modified use of tracer – injection method*

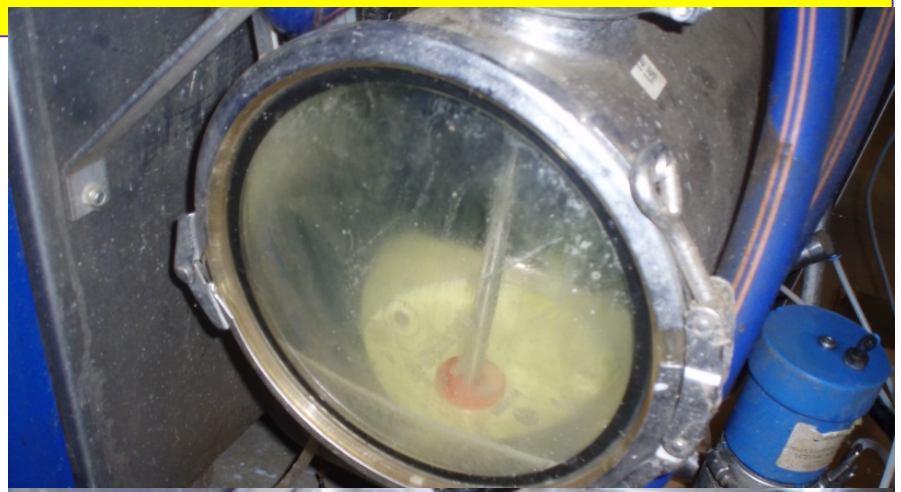


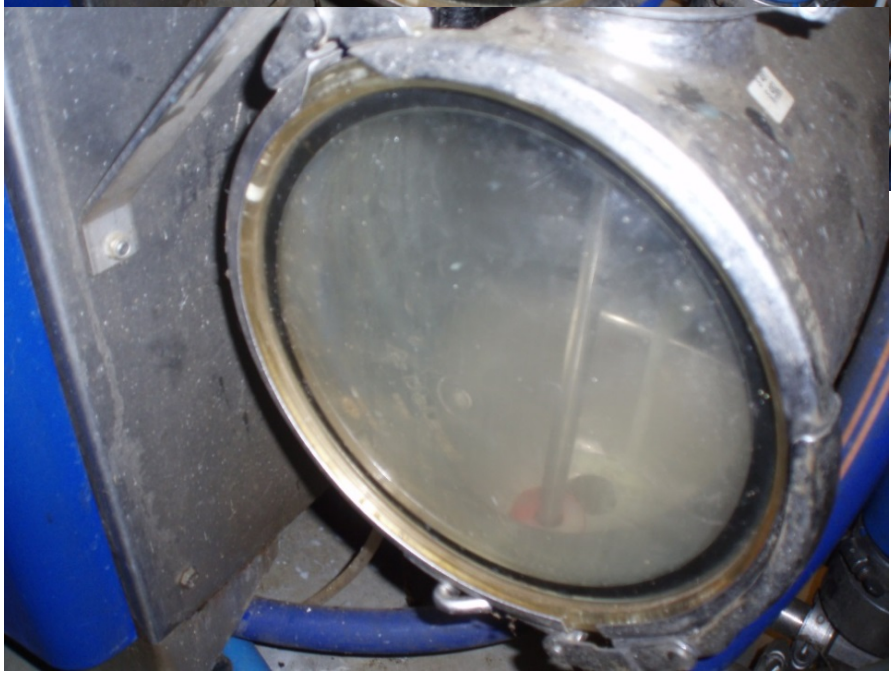
Live cow – versus bench test - results

- Lower than bench test – some bias?



Bad settings and adjustments cause C-O





Summing up – and where to go..

Suggested ”bench / herd” test is ready for use

- Modifications are possible
- As a diagnostic tool using more sampling points

- **Take home:**

Carry over can be effectively reduced by adjusting settings


Thank you – > discussion time !
DeLaval
DeLaval cassette
928658 81
27 Start
24 Start
21 Start
18 Start
15 Start
6 Start