ICAR Subcommittee on Recording Devices

ICAR Roadmap for adressing Carry Over in milk recording

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Martin Burke – ICAR recording devices SC

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Carry over and milk recording

1 sample → several origins

- **Carry Over** = fraction or residue of milk from a cow that contaminates the sample being taken from the subsequent cow.
- Variation from **2 % to 20 %** depending on devices and set up (*Løvendhal et al*)
- Sensitive or new applications :
  - Health Diagnosis : SCC, PCR, ELISA
  - MIR spectrum
  - And lots of future applications…
- Currently no criterion for ICAR approval test on new recording devices more sensitive to C-O (AMS)

ICAR SC on Recording Devices :
the Carry Over project

- **Project objectives**
  - What ?

  Update the ICAR guidelines to provide standardized method for measuring carry over and define acceptable limits.
  - Why ?

  C-O compromises sample integrity/quality and can make the test results of the milk recorded sample invalid (false positives for health test applications / problem for selection on new traits).

- **Stakeholders**

  Farmers, Dairy Herd Improvement Orgs, Breeding Evaluation Geneticists, Veterinarians, Manufacturers, Diagnostics companies, Dairy Processors, Consumer.

Project team

ICAR Recording Devices SC

- **Martin Burke**, IRL, ICAR Recording Devices SC (Chair)
- **Uffe Lauritsen**, DK, President ICAR
- **Steven Sievert**, USA, DHIA/QSC
- **Kees de Koning**, **Erik Schuiling**, NL, Wageningen Research
- **Clément Allain**, FRA, French Livestock Institute (Idele)

Research/technical experts

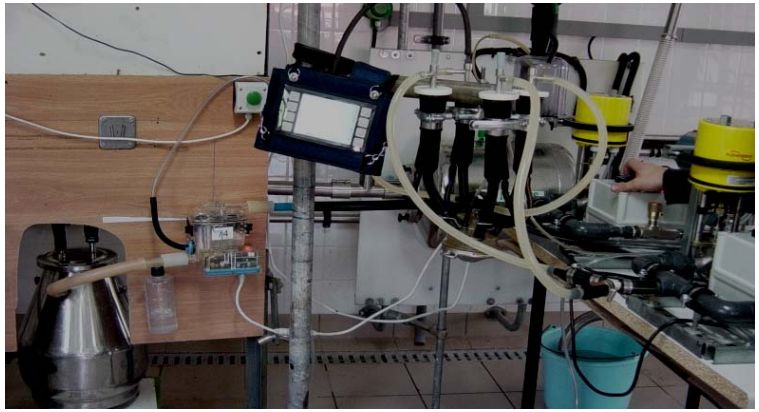
- **Peter Løvendhal, Martin Bjerring**, DK, Aarhus University
- **ICAR Milk Analysis SC**

Project milestones

1. Define the method for measuring carry-over
2. Define the acceptable limits
3. Recommandations on best practices to reduce Carry-Over

1. Define the method for measuring carry-over

- Each new device (milk meter, autosampler) intented to be used in official milk recording **need an ICAR approval**



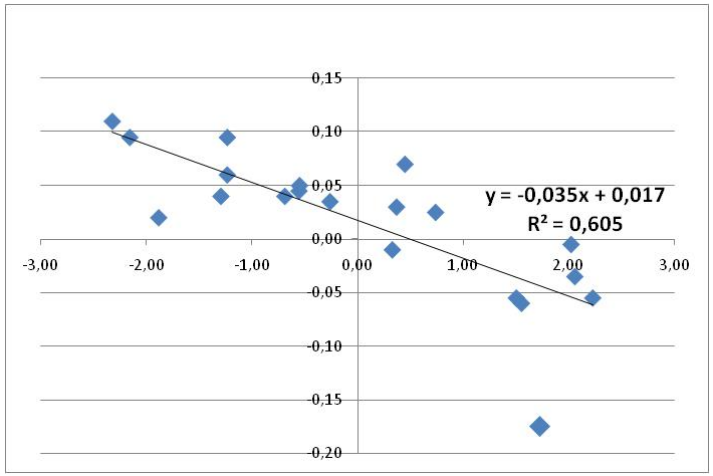
- 3 tests centres : NL, GER, FRA

- **Approval test**
  - **Laboratory test** : influence of flow rates, air bleed, vacuum level, tilting, etc. on measurement accuracy and sampling
  - **Farm test** : milk measurement accuracy and sample representativeness (fat percentage)
  - **Currently no requirement for carry-over**

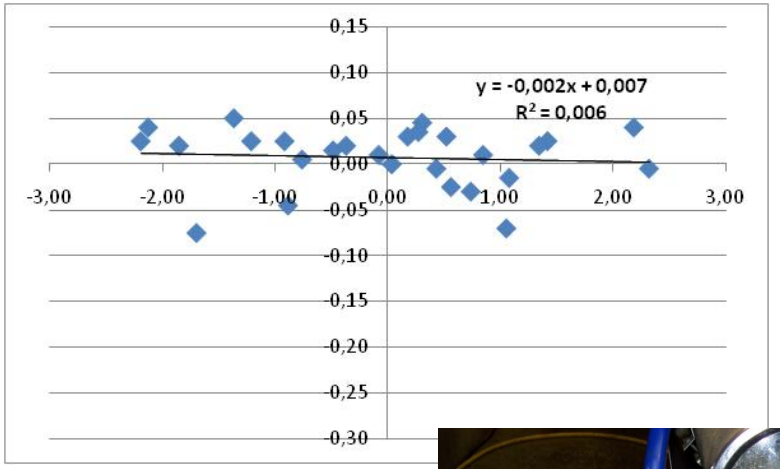
1. Define the method for measuring carry-over

- Only basic method for estimating carry-over on the farm tests: ***correlation between fat % difference of consecutive cows with bias (fat % of sample – fat % of the ref. milk)***

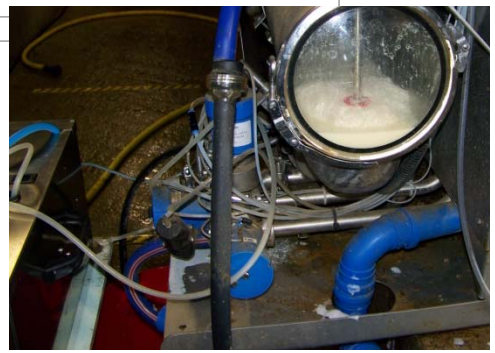
Carry-over



No carry-over



- Doesn't work if carry-over in the reference milk



1. Define the method for measuring carry-over

- **Objective :** Standard method to be used in ICAR test centres (NL, FRA and GER) for milk recording devices approvals in addition to current requirements

- **Protocole criteria required**
  - Repeatable/reproducible
  - Cost effective – using inputs affordable and available
  - Scientifically robust in eyes of all stakeholders
  - Non hazardous and environmentally safe

1. Define the method for measuring carry-over

- **How ?** Expert advice and proposals from
  - University Research facilities in Denmark (**P. Lovendhal and M. Bjerring**)
  - MASC (Milk Analysis Sub Cttee – ICAR) **Christian Baumgartner, Harrie van den Bijgaart.**
  - Tracer method (fluorescein) / Water method

- **When ?**
  - Paper presented in Aarhus 2013 to wide stakholder community
  - Incorporate into ICAR Section 11 Guidelines Berlin 2014

2. Define acceptable limits by test

- **Objective :** set limits adapted to each application
  - Different applications and different ranges of values
    - Fat (2 to 7%) and Protein content (2 to 4.5%)
    - SCC (ε to 10^6/ml)
    - PCR (0 or 1)
  - Probably don't need the same limits for fat than for SCC or PCR

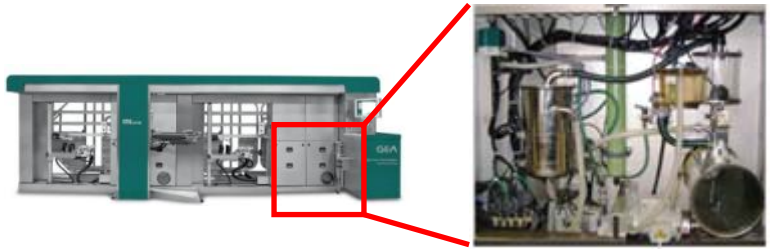
2. Define acceptable limits by test

- **How ?** Expert advice and proposals from ICAR milk analysis sub committee

	Laboratory			On-farm At-line			On-farm In-line		
Milk analytical devices	**Frequencies**	**Limits F P L**	**Limits SCC**	**Frequencies**	**Limits F P L**	**Limits SCC**	**Frequencies**	**Limits F P L**	**Limits SCC**
Units		g/100 g	Percent		g/100 g	Percent		g/100 g	Percent
Instrumental fittings				[a]			[a]		
Homogenization	Monthly	0.05 (1.43 %)	None	Yearly	0.05 (1.43 %)	None	Not relevant		
Carry-over	Monthly	1 %	2 %	Yearly	1 %	2 %	Not relevant		

3. Best practices to reduce C-O on sampling

Animal Id reliability
(visual, automatic)



Milking systems
(milking parlours, AMS)

Operators on farm
(farmer, milk recording agent, mfr technician)



Recording devices
(fixed/portable meters, Auto samplers)

C-O possible sources

Lab analysis risks

3. Best practices to reduce C-O on sampling

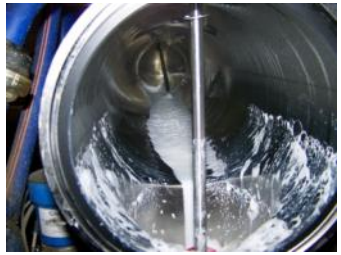
- Not guidelines but suitable practical guide for MROs and Mfrs
- Possible content

Best Test Day procedures to reduce C-O

- Devices installation as specified (levels, height)
- Sampling rules (bottles emptying)
- Equipment cleaning between animals
- AMS : approriate set up for sampling and trained personnel

Best well known practices on milking systems and recording devices

- Minimize surfaces and hidden reservoirs
- Use of slick surfaces
- Best practices on sampling (ex : previous milk surplus draining)
- Compromise no C-O / no FFA (appropriate set up)



Roadmap to Berlin 2014

1. Define the method
2. Define the acceptable limits
3. Recommandations on best practices to reduce Carry-Over and discussion with stakeholders
4. Presentation and sharing in Berlin 2014

Thanks for your attention !