
Effect of inclination and vacuumlevel on the recording accuracy of portable milkmeters

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The examination enclosed five different portable milkmeters. The milkmeters were chosen as a result of their prevalence in Austria (Table 1).

Summary

Table 1. Devices in trial.

Devices	
Device No. 1	LactoCorder
Device No. 2	Waikato Mark 5
Device No. 3	MilkoScope II
Device No. 4	Tru - Test HI
Device No. 5	Tru - Test FD

The meters were checked under laboratory conditions with water. The test procedure has been carried out in accordance to the “Recording Guidelines” (ICAR; 1995). The examination of each device surrounded 2 directions of inclination , 4 angles of inclination (0,5, 10, and 15 degrees) and two different vacuumlevels (40 kPa and 50 kPa). The study showed significant differences on recording accuracy by vacuumlevel and also by angle of inclination.

Key words: *Milkimeters, recording accuracy, test with water, inclination, vacuum level*

Introduction

The portable milkmeters for the examination are taken to the farms for recording by the official representatives of the provincial milk recording association. This portable milkmeters are used on farms with pipeline milking machine systems as well as on farms with milking parlours. There is a big difference between the normal position of the milkmeters (perpendicular) and the deviation of the perpendicular positions. A further problem is concerning the recording accuracy emerges due to the different rates of vacuum on the different farms.

Results

To limit the examination's extent in a practical range some pilot tests were done to get the direction of inclination with the highest specific failure.

For this reason the milkmeters were inclined in four directions (right - left, front - back) with 15 degrees each. The two positions dividing the most from the real value were taken into account in the experiment's plan.

To approximate the practical situation, the effect on the recording accuracy of simultaneous inclination in both directions was additionally checked.

The project contains, in addition to the optimal position (perpendicular), the inclination angles of 5, 10, 15 degrees in all directions, committed in the pilot test.

Even all examinations were performed with a system vacuum of 40 kPa and 50 kPa. The evaluation was done with the "Mixed Model Least - Squares and Maximum Likelihood" Computer program (in the version PC - 2 of HARVEY, 1990).

Results according to all devices (Total experiment) are summarised in table 2.

High significant differences ($P < 0,001$) in the recording accuracy between all devices were observed.

Table 2. Recording accuracy of each device in % (LSQ).

	Recording accuracy in %						
	Devices					S	P
	1	2	3	4	5		
No.	132	200	200	200	200		
Recording accuracy in %	-3.80a	5.74bd	-3.79a	3.77c	5.1d	6.64	0.0000

a, b, c, d, bd, ... different letters show significant ($P < 0.1$) differences.

There is no difference between device 1 and device 3, but a significant difference to all the others. Further more there is a significant difference between device 4 and device 5. Between device 2 and device 5 no significant differences could be observed.

Although high significant differences between the both vacuum levels ($P < 0.001$) could be observed (Table 3).

Table 3. Recording accuracy of both vacuum levels in % (LSQ).

No.	Recording accuracy in %			
	Vacuum		S	P
	40 kPa	50 kPa		
Recording accuracy in %	460	472	6.64	0.0000

Results according each device are reported in table 4 and 5.

Table 4. Recording accuracy of all directions of inclination and all angles of inclination in % (LSQ).

	Recording accuracy										S	P
	0/0	0/5	0/10	0/15	5/0	10/0	15/0	5/5	10/10	15/15		
	Recording accuracy in %											
Device no. 1	-3.34	-3.92	-4.55	-4.55	-3.42	-4.50	-3.57	-3.27	-3.64	-3.27	0.73	0.0000
Device no. 2	-4.24	-0.70	1.46	44.02	-2.72	-2.65	12.06	-0.10	1.51	8.72	6.95	0.0000
Device no. 3	-0.91	-1.11	-2.08	-3.47	-2.00	-4.53	-6.34	-2.88	-6.47	-8.06	0.74	0.0000
Device no. 4	3.45	3.92	4.82	6.52	3.23	3.06	3.86	3.30	3.27	2.17	1.17	0.0000
Device no. 5	1.56	2.73	6.84	8.50	2.58	2.48	2.72	5.46	5.73	12.40	0.93	0.0000

Table 5. Recording accuracy of all devices in both vacuum levels in % (LSQ).

	Recording accuracy			
	Vacuum		S	P
	40 kPa	50 kPa		
Device no. 1	-3.61	-3.99	0.73	0.0039
Device no. 2	-0.07	11.54	6.95	0.0000
Device no. 3	-4.33	-3.24	0.74	0.0000
Device no. 4	3.80	3.74	1.17	0.7402
Device no. 5	3.51	6.68	0.93	0.0000

All 5 examined devices showed significant differences in the recording accuracy between the different positions.

Both different vacuum levels result in 4 devices in significant differences of recording accuracy, only device 4 showed no significant differences in this case.

References

Harvey, W.R. ,1990; User's Guide for Mixed Model Least-Squares and Maximum Likelihood Computer Program. Ohio State University.

ICAR, 1995; International Committee for Animal Recording. Recording Guidelines. Appendices to the International Agreement of recording practices, ICAR, Via Nomentana 134, 00185 Rome, Italy.