

# Development of a field test to evaluate colostrum quality (immunoglobulins) in cattle



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## BACKGROUND

Failure of transfer of immunity from dam's colostrum generates a negative effect on calves' health leading to increased morbidity and mortality (De Nise et al., 1989; Wittum and Perino, 1995). Immunoglobulins (IgG) content of colostrum is highly variable and cannot be predicted. Distinguishing good from poor quality colostrum allows to adapt the volume administered or to initiate ancillary procedures for a sufficient transfer of IgG. **The aim of the study was to evaluate the performances of a field test for colostrum quality assessment.**

## MATERIAL & METHODS

### > Patients

⇒ Healthy primiparous/pluriparous cows, Belgian Blue breed.

### > Colostrum sampling

⇒ Directly at calving, in 50 mL plastic jar.

⇒ CMT to reject subclinical mastitis.

⇒ 3 mL of colostrum in COL-IgG-Test

⇒ Dilution of colostrum 1:1 with fresh milk (CMT -)

→ COL-IgG-Test

⇒ Sample frozen (-20°C) before further analysis.

### > Biochemical investigations

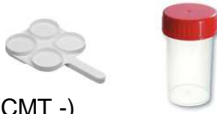
⇒ COL-IgG-Test: ½ quantitative field test developed by Ambulatory Clinic (ULg).

### ⇒ Laboratory assays:

⇒ IgG in serum : Radial-Immuno-Diffusion (IODOLAB), as the « Gold-Standard »

### > Data analysis

⇒ Determination of Se, Sp, NPV/PPV, Y, K of COL-IgG-Test



## The COL-IgG-Test



### ⇒ COL-IgG-Test

⇒ 12 mL glass tube containing Na<sub>2</sub>-EDTA, a solution with 12.5 mg Glutaraldehyde and excipients. Single-use (RTU).

### ⇒ Procedure

- ① Import 3 mL of colostrum directly into the Test-tube.
- ② Rotate the tube 2 times to mix. Switch on the timer.
- ③ Every 30 seconds, rotate the tube again and observe the time of colostrum coagulation (adherent clot in the bottom of tube)

### ⇒ Interpretation of the COL-IgG-Test

Coagulation time	Interpretation	[IgG]
≤ 4 MIN.	Good Colostrum	≥ 50 g/L
> 4 MIN.	Poor Colostrum	< 50 g/L

## RESULTS

A total of 91 cows from 13 farms were assayed. The IgG concentration and the coagulation time were 92 ± 32 g/L (mean ± SD) and 3.7 ± 2.5 MIN., respectively. Compared to RID, COL-IgG-Test had a **Sensitivity of 100%**, a **Specificity of 90%**, a Negative Predictive Value of 100%, a Positive PV of 53%, a Youden of 0.9, a Kappa of Cohen of 65% and a X<sup>2</sup> of 43 (p<0.001). The low PPV comes to the fact that only 10% of colostrum were judged poor. With diluted-colostrum, a new population of 182 samples was constituted with an IgG concentration of 69 ± 34 g/L and a coagulation time of 5 ± 3.4 minutes. Among that population, there were 32% of poor quality colostrum. Performances of the test revealed a Se of 93%, Sp of 82%, NPV of 96%, PPV of 71%, Y of 0.75, K of 70%, X<sup>2</sup> of 93 (p<0.001).

## DISCUSSION / CONCLUSIONS

COL-IgG-Test principle is based on the aptitude of gamma-globulins to coagulate while in contact with glutaraldehyde (Sandholm, 1974). In this study, only 10% of cows presented poor quality colostrum, which is in accordance with a recent study (Quigley et al., 2013). The dilution increased the PPV but slightly decreased the global performances of the test; however, the concordance (K) with Gold-Standard was somewhat better. This test, used with pure colostrum, presents a similar concurrence with gold-standard evaluation and is a reliable control for a field test. COL-IgG-Test is one of the most accurate and user-friendly semi-quantitative field test for the determination of colostrum quality.

## References

DeNise SK et al. J Dairy Sci. 72 (1989), 552-54  
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