

# Effect of storage conditions and initial bacterial load on the microbiological quality of colostrum

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## INTRODUCTION

- ▶ Colostrum contains high quantities of immunoglobulin (IgG) which is necessary for the newborn calf to obtain passive protection against disease.
- ▶ Absorption of colostral IgG's can be hampered by the bacterial contamination of the colostrum. Colostrum storage conditions may alter the bacterial concentration in colostrum over time and therefore may negatively impact the absorption of IgG's by the newborn calf.

## OBJECTIVE

The objective of this study was to measure the effect on the Total Bacterial Cell Count (TBCC) and the Total Coliform Count (TCC) of storing colostrum in different conditions over time.

Additionally, the influence of the initial bacterial load of the colostrum samples at the start of the storage period on the evolution of the TBCC and TCC was evaluated.

## MATERIALS AND METHODS

- ▶ This study was part of a larger study in which 76 paired colostrum samples were collected from 38 Holstein-Friesian cows originating from 3 different farms in the Netherlands. A random selection of colostrum samples from this larger study was processed in the current study. Five samples with a low TBCC ( $\leq 1,000$  cfu/ml) and a low TCC ( $\leq 10$  cfu/ml) (low initial bacterial load) and five samples with a high TBCC ( $\geq 1,000,000$  cfu/ml) and high TCC ( $\geq 1,000$  cfu/ml) (high initial bacterial load) were randomly selected.
- ▶ Colostrum samples were stored for up to 120 hours in temperature-controlled units set at 4, 22, and 30 °C. All colostrum samples were analysed for TBCC and TCC after 0, 24, 48, 72, 96 and 120 hours of storage. TBCC and TCC were determined at 30°C using standard accredited bacteriological protocols. Log transformation of the data was applied in case of non-normal distribution. Repeated measures ANOVA with post-hoc Tukey HSD testing was performed to assess the evolution of the TBCC and TCC over time at different storage temperatures.

Storing colostrum at temperatures above 4°C should be avoided.

Storage of colostrum with a high initial bacterial load (TBCC  $\geq 1,000,000$  cfu/ml and TCC  $\geq 1,000$  cfu/ml) at 4°C for more than 48 hours results in a significant increase in TBCC and TCC.

Besides the storage of colostrum at an appropriate temperature, hygienic harvesting of colostrum is of utmost importance for its microbiological quality.



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## RESULTS

- ▶ In colostrum samples stored at 4°C the TBCC showed a minor non-significant increase after 4 to 5 days of storage.
- ▶ After 1 day of storage of colostrum at 22°C a significant increase of the TBCC was observed, reaching its peak after 2 days of storage.
- ▶ At 30°C the TBCC of colostrum increased sharply reaching its peak after 1 day of incubation, then the TBCC plateaued for the next day of storage after which a decline in TBCC was observed (Fig 1a).
- ▶ In the samples with a low initial bacterial load TBCC remained low during storage at 4°C. In the samples with a high initial bacterial load, a significant increase of the TBCC was seen from day 3 of storage at 4°C (Fig 1b).
- ▶ The TCC of colostrum showed a similar evolution as the TBCC during the storage at different temperatures (Fig 2a).
- ▶ In the samples with a high initial bacterial load the TCC declined markedly after 2 days of storage at 22 and 30°C. Whereas, at 4°C an increase in TCC was observed after 3 days (Fig 2b).

FIGURE 1. Log Total Bacterial Cell Count of colostrum during different storage conditions

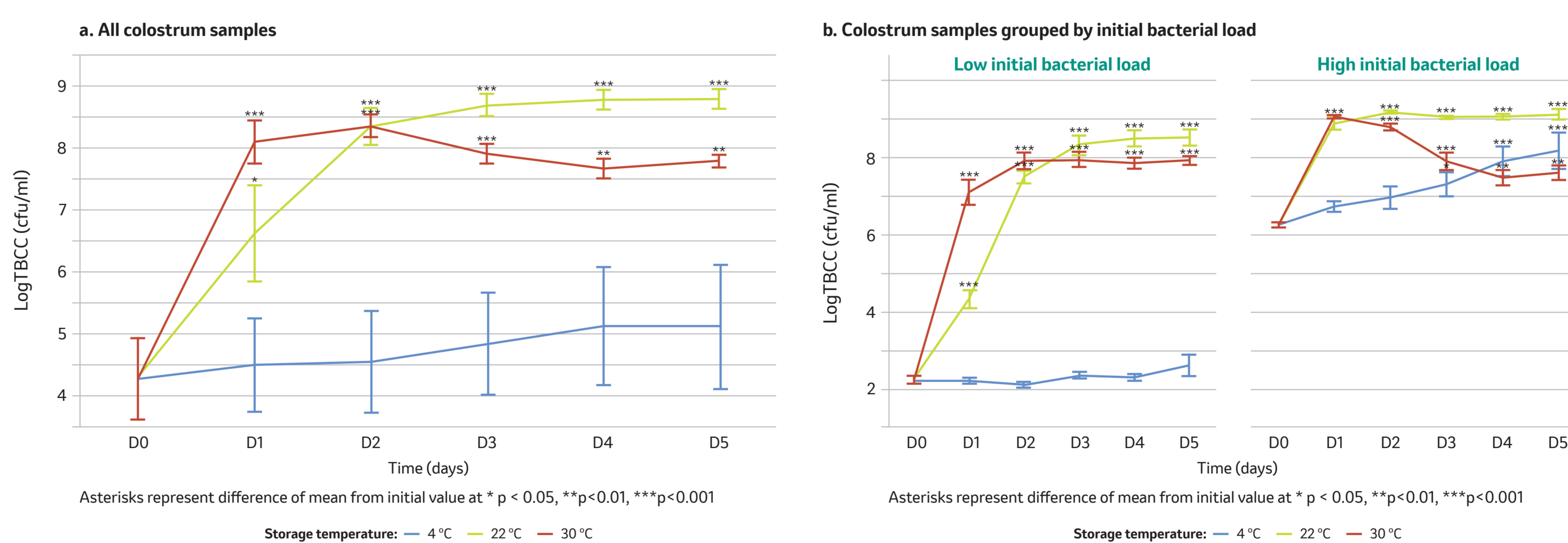
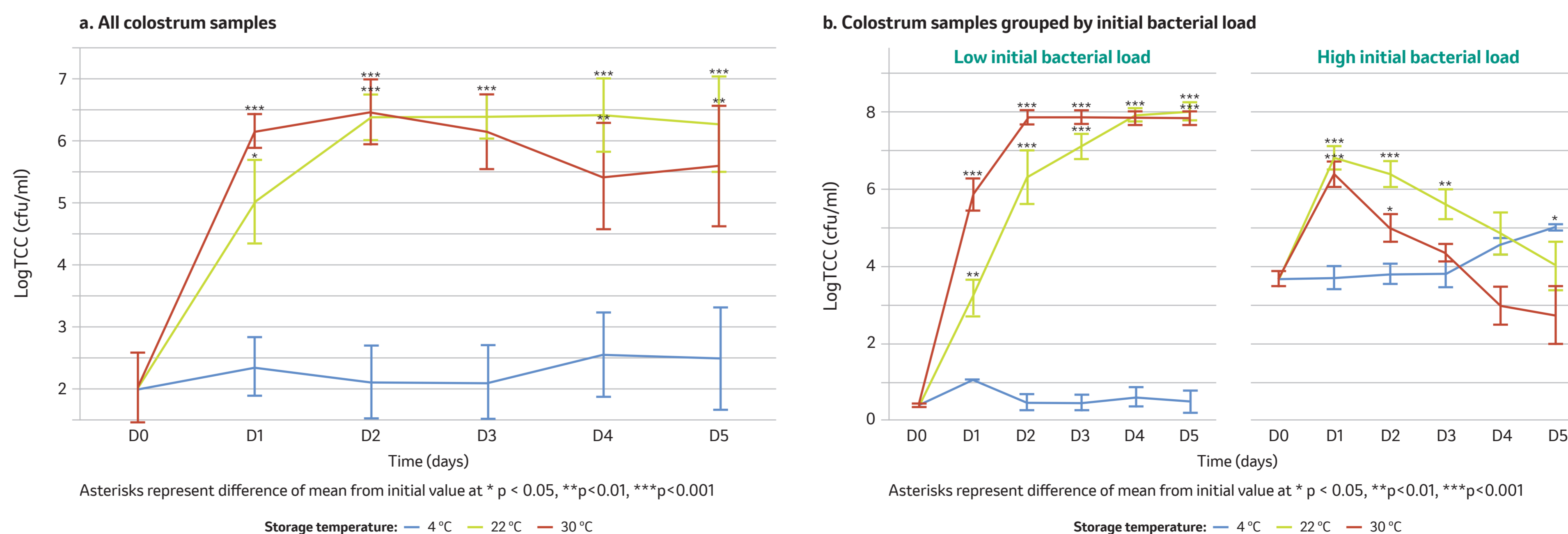


FIGURE 2. Log Total Coliform Count of colostrum during different storage conditions



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