

# Heat Stability of A2 Milk: First Observations



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## Introduction

Bovine milk protein genes have been thoroughly investigated, and a noticeable genetic variation has been identified and characterized. The importance of these genetic variation is related to modifications of the protein, mainly amino acid exchanges or deletions, which affect the biological and technofunctional properties of milk.

## Objectives

This experimental research analyses the thermal stability of milk, comparing normally commercialized milk with genetically selected milk containing A2A2  $\beta$ -casein.

## Materials and Methods

- **Two different bulk milks:** control milk (containing different genetic variants of  $\beta$ -casein) and A2A2 milk (containing A2 genetic variant of  $\beta$ -casein).
- **Thermal stability of milks** (whole and skimmed milks)
- **Alcohol test** (Horne et al. 1990)
- **Objective heat stability assay** (140 °C, 10 min) (Renhe & Corredig 2018)
- **Phosphate test** (Gaucher et al. 2008).
- **Statistics:** Paired t-test (MS Excel 2013)

## Results

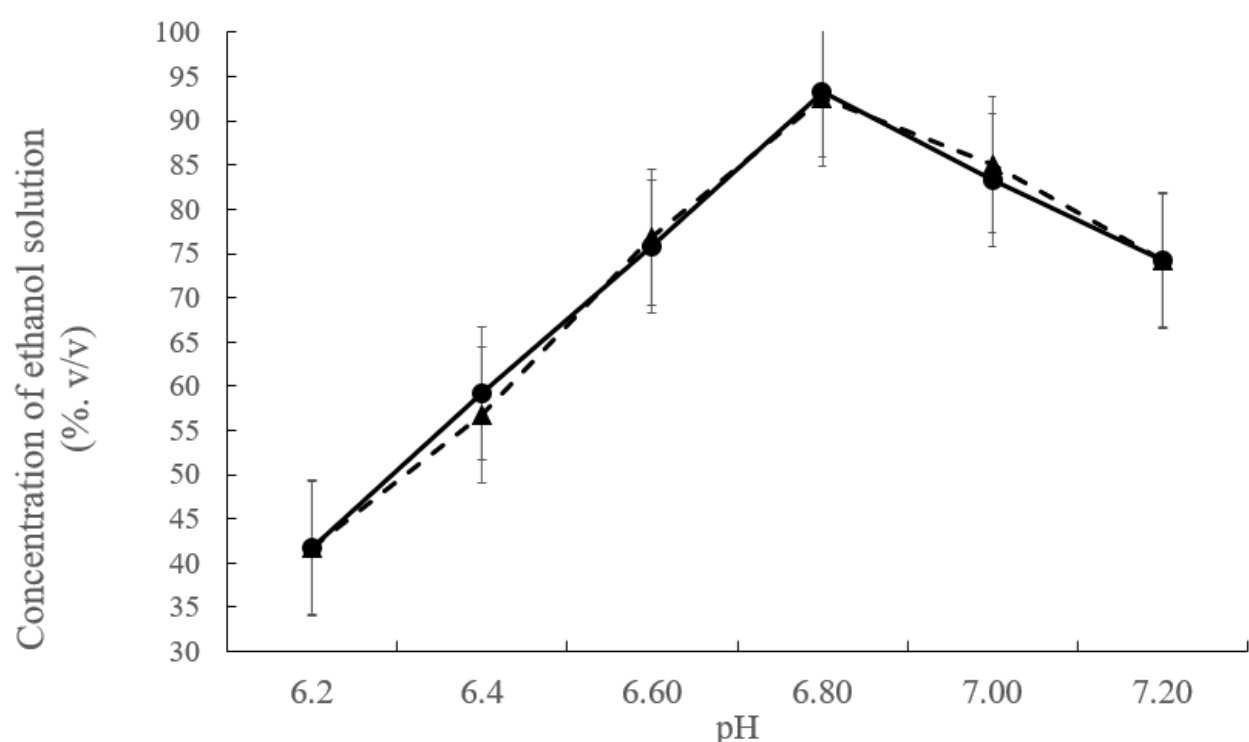


Figure 1. Alcohol test-pH profile of control (●) and A2 (▲) skimmed milks.

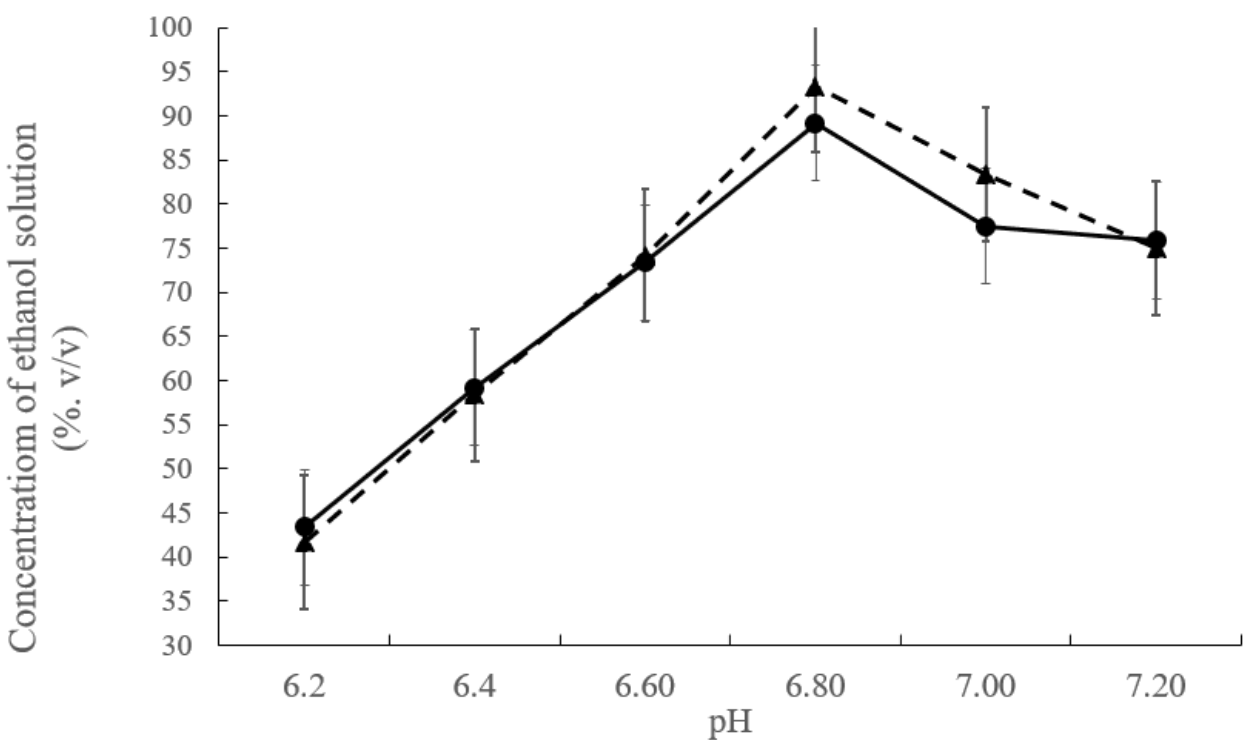


Figure 2. Alcohol test-pH profile of control (●) and A2 (▲) whole milks.

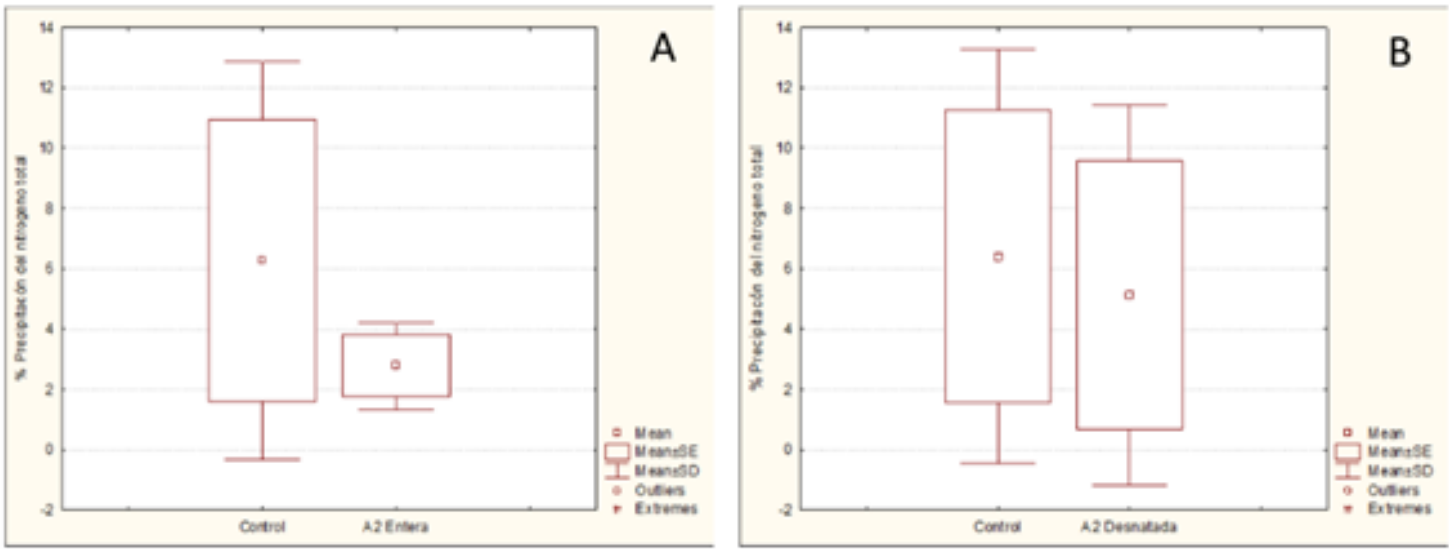


Figure 3. Precipitated total nitrogen (%) obtained in whole (A) and skimmed (B) A2 and control milks subjected to 140 °C for 10 min, compared to their non heated counterparts.

Milk		KH <sub>2</sub> PO <sub>4</sub> (mL)
Skimmed	A2A2	1.10 ± 0.00
Skimmed	Control	1.05 ± 0.07
Whole	A2A2	1.10 ± 0.14
Whole	Control	1.15 ± 0.21

Table 1. Mean and standard deviation of 0.5 M H<sub>2</sub>PO<sub>4</sub> (mL) producing milk coagulation.

## Conclusions

Preliminary results do not show significant differences in heat stability between A2A2 and the Control milks. In consequence, it seems to be not required for dairy industry to make changes in heat treatments to process this new A2A2 milk. At the moment, knowledge is scarce about the effect of A2A2 phenotype of  $\beta$ -casein on its heat stability, so it is necessary conduct more tests to reduce the variability and get more samples to contrast their thermal stability.

## References

• Gaucher et al. (2008). Dairy Sci. & Techn., 88(3), 291–312. <https://doi.org/10.1051/dst:2007022>

• Horne et al. (1990). Alcohol and heat stability of milk protein. J. Dairy Sci., 73, 3613–3626. [https://doi.org/10.3168/jds.S0022-302\(90\)79064-9](https://doi.org/10.3168/jds.S0022-302(90)79064-9)

• Renhe et al. (2018). J. of Dairy Sci., 101(10), 8757–8766. <https://doi.org/10.3168/jds.2018-14407>