

# Proficiency Testing on natural versus artificial milk samples

M. Abdel Massih<sup>1</sup>, F. Monterroso<sup>1</sup>, M-J. Goffaux<sup>2</sup>, F. Ferber<sup>2</sup> and J. Mahillon<sup>1</sup>

<sup>1</sup> Laboratory of Food and Environmental Microbiology, Université catholique de Louvain, Louvain-La-Neuve, Belgium

<sup>2</sup> REQUASUD ASBL, Gembloux, Belgium

## Context

Proficiency Testing (PT) aim to assess the laboratories' performances by the analysis of identical samples. Food microbiology PT provide mostly artificial PT items (reference materials, sterile spiked samples).

Naturally contaminated PT items are rarely provided because technically challenging: they host an unpredictable, unstable and heterogeneous microbial flora. However, the samples analyzed in real life by the laboratories are naturally contaminated foodstuffs.

There is a need to study the influence of the PT samples (natural vs artificial) on the results of food microbiology PT.

Correct PT results on artificial items

Laboratory deemed competent for the analytical parameter

Can we draw conclusions on the laboratories' proficiency in routine, based on their results on artificial PT samples?



A PT scheme involving 14 laboratories was organized in 2014 to compare the performances on "artificial" (UHT milk) and on "authentic" (raw milk) samples, spiked at identical levels.

## Results & Discussion

The enumeration of 8 routine parameters was carried out by the participants. Some parameters (e.g. coliforms, *S. aureus*) were under control, both in the UHT and raw milk samples.

For most parameters, however, the results were good in the UHT milk (indicating that the parameter is under control) but very incoherent in the raw milk (Fig.1). For the raw milk sample, the Petri dishes were much more arduous to enumerate due to the variety of colony types and to interfering flora.

Globally, the inter-laboratory standard deviation ( $s_R$ ) was always higher in the raw milk than in the UHT milk sample (Fig.2).

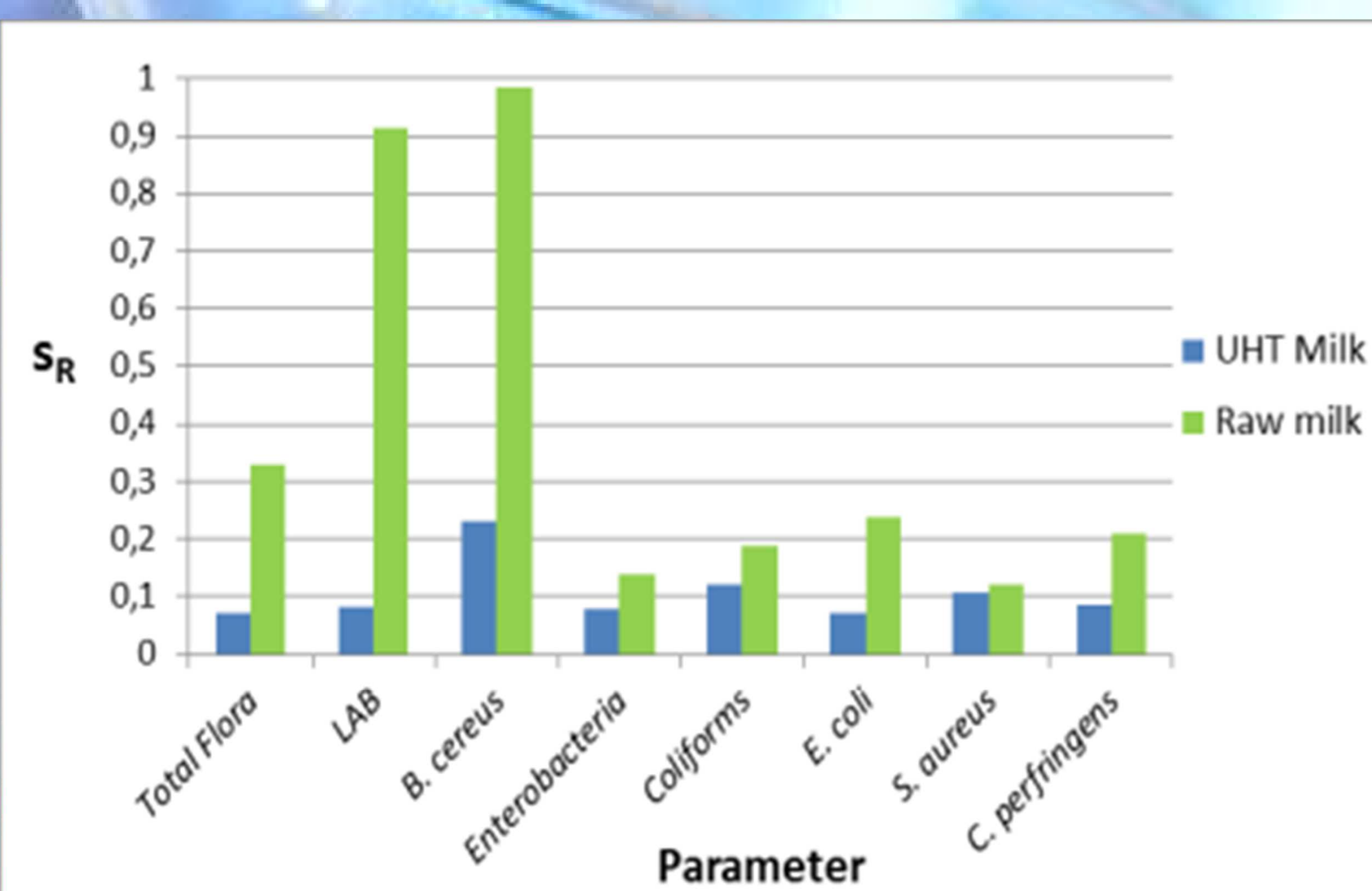
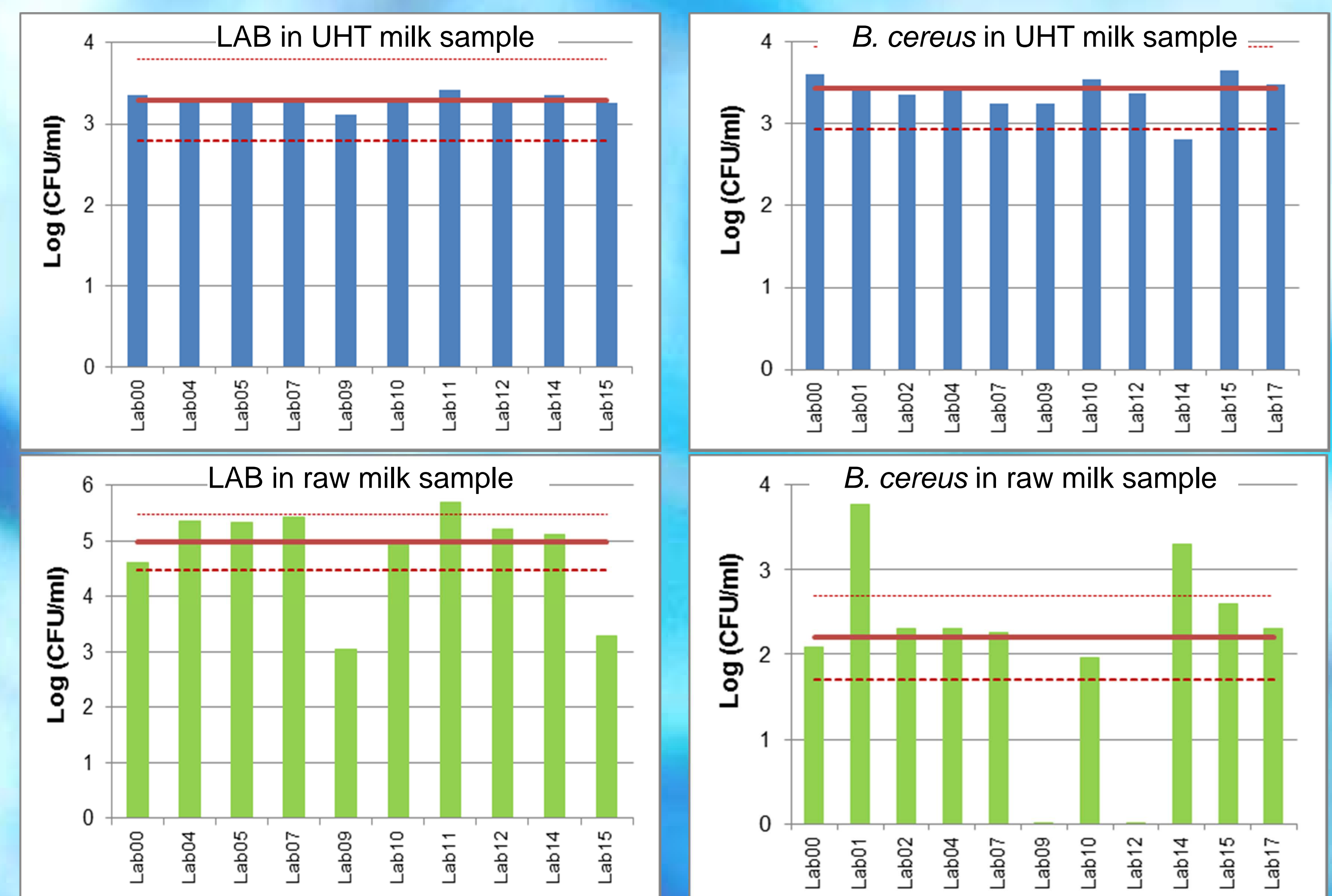


Fig.2: Inter-laboratory standard deviation of the 8 parameters analyzed during PT 2014.



The use of an artificial PT sample resulted in a systematic underestimation of the analytical variability.

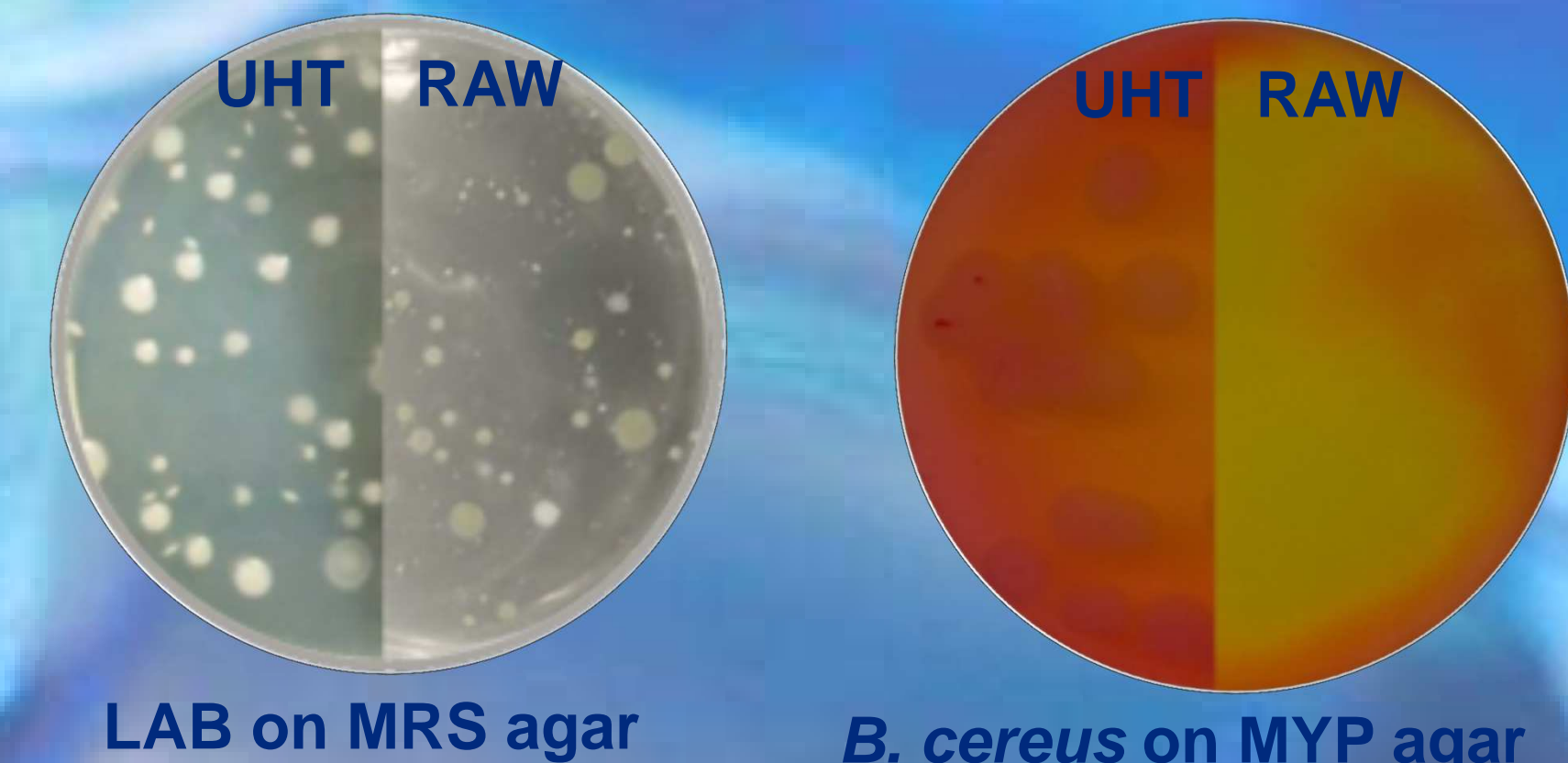


Fig.1: Results of enumeration of lactic acid bacteria (LAB) and *B. cereus* (—: assigned value ; - - : tolerance interval).

## Conclusions

When the laboratories' performance is assessed solely on the basis of artificial PT samples, some microbiological parameters appear "under control" while they are, actually, really problematic in naturally contaminated food samples. Major analytical hitches are disregarded and the inter-laboratory variability is under-estimated when using exclusively artificial PT samples.

To truly assess the analytical performances of the laboratories in real-life conditions, PT providers should include at least one authentic, natural sample in their PT schemes.