

How to choose the enrichment procedure for detection of *Campylobacter* in food?

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Background

Detection of *Campylobacter* in food may be difficult due to growth of extended-spectrum β -lactamase (ESBL)-producing *Enterobacteriaceae* during enrichment, resulting in false-negative samples. Therefore, the ISO protocol (ISO 10272-1:2017) suggests that next to Bolton broth, Preston broth is used as enrichment broth to inhibit competitive flora in samples with suspected high levels of ESBLs. However, detection of the strains used for validation of this ISO was not clearly characterized.

Objectives

This study examined:

- The LOD₅₀ (level of detection, concentration where probability of detection is 50%) of the five validation strains (3 *C. jejuni*: strains A, B and D; 2 *C. coli*: strains C and E) in food matrices raw milk, chicken skin, minced meat and frozen spinach using Bolton broth (BB) or Preston broth (PB).
- The effect of inoculated ESBL *E. coli*.

Results

In BB, the LOD₅₀ of all strains tested in raw milk, chicken skin and frozen spinach was 0.7-2 log CFU/sample (Fig 1A). Results for minced meat showed a large variation in LOD₅₀ of 1-1000 CFU/sample, dependent on the strain (Fig. 1A). Generally, enrichment in PB resulted in higher LOD₅₀ than in BB, especially for *C. coli* (Fig 1B). Addition of ESBL *E. coli* to the BB resulted in significantly higher LOD₅₀ for all strains tested in raw milk (Fig. 2) and for strain B in chicken skin (data not shown). PB inhibited the growth of ESBL *E. coli* (data not shown) which resulted in significantly lower LOD₅₀ for all *Campylobacter* strains except strain B.

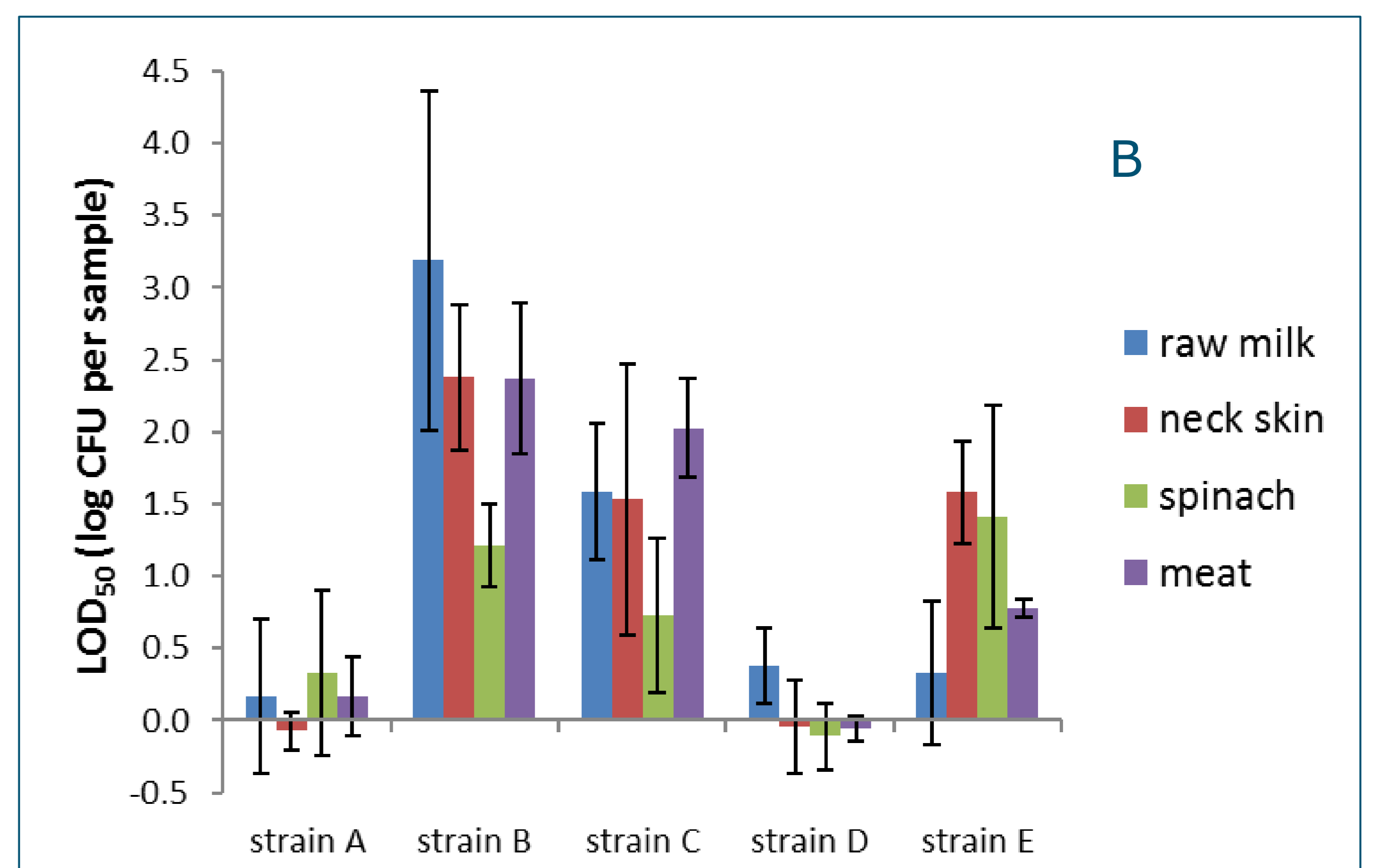
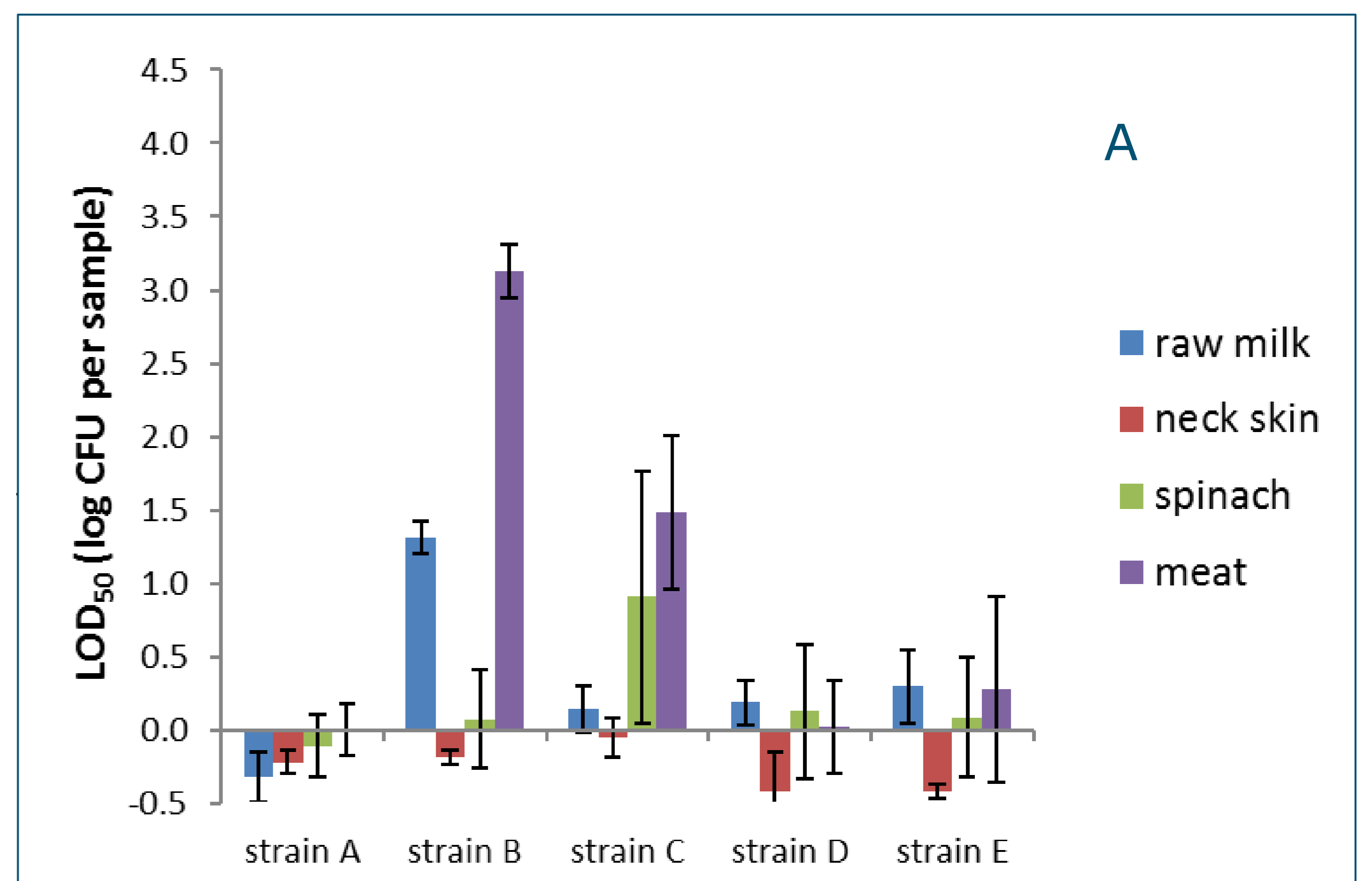


Figure 1. Average LOD₅₀ (Log₁₀ CFU per sample) of *Campylobacter* strains inoculated in raw milk, chicken neck skin, frozen spinach and minced meat examined in BB (A, n=2-5) and PB (B, n=4-6). Error bars indicate the standard deviation.

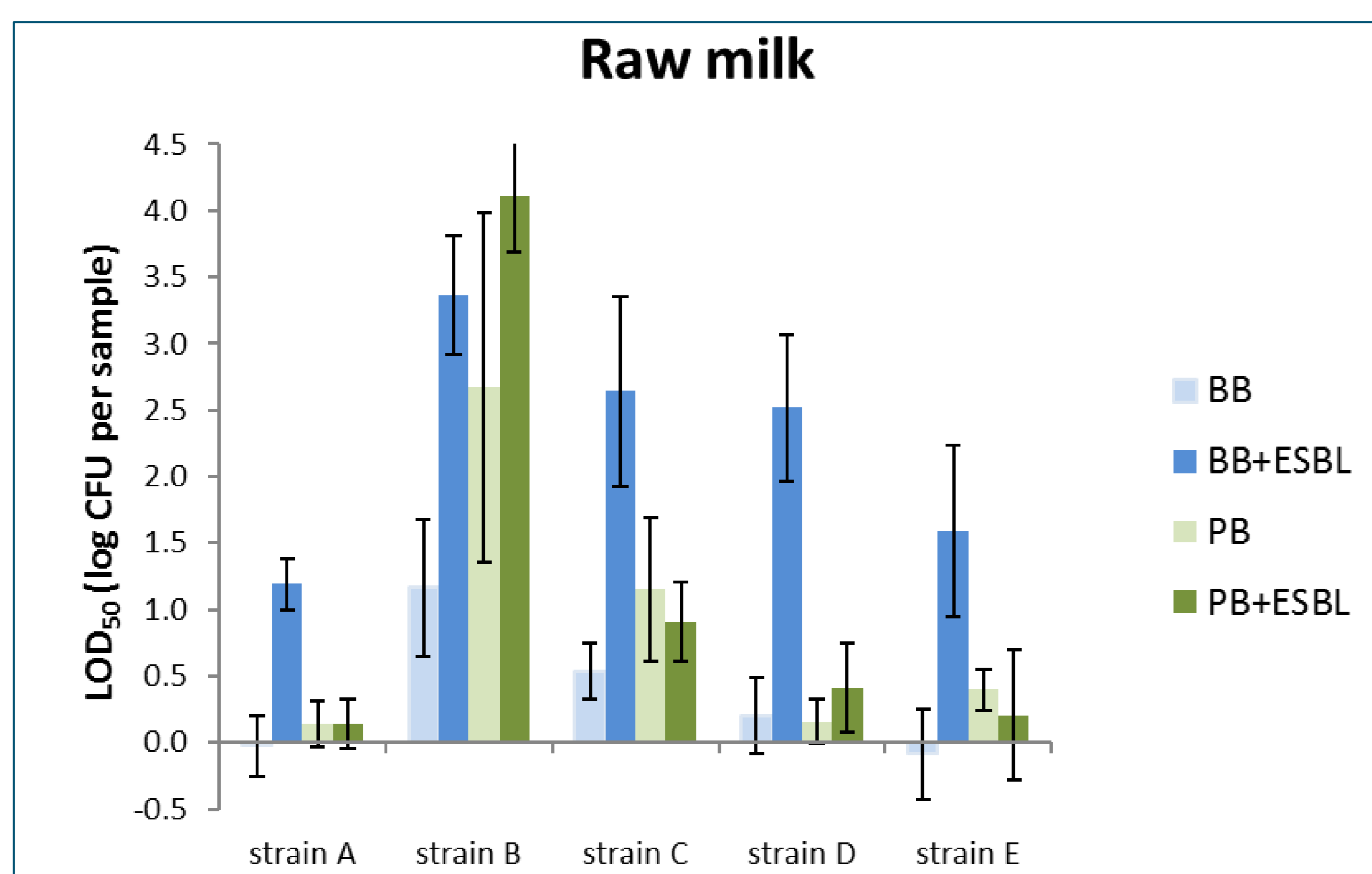


Figure 2. Average LOD₅₀ (Log₁₀ CFU per sample) of *Campylobacter* strains inoculated in raw milk, examined in BB and PB. Furthermore, the effect of inoculated ESBL *E. coli* (+ESBL) was examined (n=3-5, error bars indicate the standard deviation).

Conclusions

- Choice of enrichment broth and food matrix may have a large influence on the LOD₅₀ of different *Campylobacter* strains.
- Preston broth successfully inhibited the growth of ESBL *E. coli*, but may result in higher LOD₅₀ compared to Bolton broth.
- When in doubt about the choice of enrichment broth, we suggest to use both methods.

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Related to this topic

Reference to our other poster, P127, by Maren Lanzl et al.: Effect of stress on variability in lag-duration of *Campylobacter* spp. during enrichment.

