A collaborative study on a Nordic standard protocol for detection and enumeration of thermotolerant Campylobacter in food (NMKL 119, 3. Ed., 2007) - DTU Orbit (11/12/2018)

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A Nordic standard protocol for detection and enumeration of thermotolerant Campylobacter in food has been elaborated (NMKL 119, 3. Ed., 2007). Performance and precision characteristics of this protocol were evaluated in a collaborative study with participation of 14 laboratories from seven European countries. The laboratories performed qualitative, semi-quantitative, and quantitative analyses on samples of chicken meat, cut lettuce, and milk artificially inoculated with different concentrations including blank duplicates of one strain of Campylobacter coli (SLV-27 1) and one strain of Campylobacter jejuni (SLV-542). Expected concentrations (95% C.I.) (cfu g(-1) or ml(-1)) of both strains in matrices were 0.6-1.4 and 23-60 for qualitative detection, and 0.6-1.4; 23-60; and 420-1200 for semi-quantitative detection. For quantitative determination, the expected concentrations of C. jejuni/C. coli were 420-1200/580-1100; 2100-6000/6300-11,000; and 4100-11,000/53,000-97,000 cfu g(-1) or ml(-1). The qualitative and semi-quantitative techniques resulted in comparable detection. The overall specificity and sensitivity of the detection techniques was 98.6% (95% C.I.: 95.1-99.8%) and 82.8% (C.I.: 78.4-86.6%), respectively. The sensitivity was not influenced by food matrix (P=0.359), but was significantly lower for C. coli compared to C. jejuni (P= 0.007) and for concentrations below 1.4 cfu g(-1) (P<0.00 1). The detection techniques were therefore only considered satisfactory for detection of Campylobacter concentrations above approximately 25 cfu g(-1) for all matrices tested, which was supported by calculation of values for accordance, concordance, and concordance odds ratio. No statistical difference was found between enumerations obtained by the semi-quantitative and quantitative techniques for comparable concentrations of Campylobacter (420-1200 cfu g(-1) or cfu ml(-1)) (P= 0. 104). Both techniques underestimated concentrations of thermotolerant Campylobacter in milk. The semiquantitative technique estimated low inoculation levels of Campylobacter more correctly than the high inoculation levels. Counts obtained on the two selective plating media, Abeyta-Hunt-Bark agar added to it 0.1% triphenyl tetrazolium chloride and modified charcoal cephoperazone desoxycholate agar were not significantly different (P=0.143). Expressed as an absolute difference between log(10)-transformed results, the overall values for repeatability (r) and reproducibility (R) were r=log(10) 0.43 and R=log(10) 1.99, respectively. By omitting results from laboratories with high level of variability in results, R was reduced to log(10) 1.88. We suggest that the poor detection of low numbers, the underestimation in milk samples, and the large variation between laboratories can be explained by the general difficulties in handling Campylobacter. In conclusion, NMKL 119, 3. Ed., 2007, is regarded as an acceptable protocol for detection of thermotolerant Campylobacter at concentrations above 25 cfu g(-1) and also for enumeration of thermotolerant Campylobacter in chicken meat.

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