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VBNC-*Campylobacter* in the environment: findings from the field and experimental studies

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**Objective:** Chicken meat is the most important source of infection for campylobacteriosis in humans. However, the pathways in which *Campylobacter* colonize new chicken flocks can often not be clearly described. The barn environment is a critical reservoir for *Campylobacter* at broiler farms. It has been repeatedly discussed that exposure to environmental stressors can induce a transition to a viable but non-culturable (VBNC) state. In this study, we investigated the occurrence of culturable *Campylobacter* and VBNC-*Campylobacter* at three broiler farms and their environments. In addition, the formation and persistence of VBNC-*Campylobacter* in chicken manure, soil and water were analyzed in an experimental approach.

**Methods/Results:** The detection rate in environmental samples of *Campylobacter*-positive flocks, mainly sock swabs, was 14% (12/86) for VBNC-*Campylobacter*, while the pathogen was cultivable in one environmental water sample (1.2%). Interestingly, *Campylobacter* DNA was detectable in all 28 environmental air samples.

In the experimental approach, no cultivable *Campylobacter* (*C.*) *jejuni* was detected in chicken manure after 24 hours following the removal of a *Campylobacter*-positive group of broiler chickens. In contrast, the detection of VBNC-*Campylobacter* was still possible after 72 hours (last sampling time point).

Laboratory studies with soil and water samples artificially contaminated with cultivable *C. jejuni* showed that the VBNC state was induced after three to 15 days (depending on temperature and humidity). VBNC could still be detected up to the last sampling time point, i. e. 28 days in soil and 63 days in water.

**Conclusion:** In summary, the isolation of CFU and VBNC-*Campylobacter* from environmental samples remains methodologically challenging. The studies do provide important insights into the subject. For example, the potential for prolonged persistence of VBNCs in the environment, which remains potentially infectious, was demonstrated.

**Keywords:** *Campylobacter*, VBNC, chicken