
**Modification of the chicken caecal microbiome by *Campylobacter jejuni* colonization and by a feed additive**

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*Campylobacter jejuni* is a foodborne pathogen causing severe enteritis in humans with chickens being the most important identified source of *C.jejuni.* It colonizes the chicken caecum up to $10^9$ CFU/g of caecal matter. Despite this, chickens were rarely proven affected by *C.jejuni* presence. The effect of such intense colonization on the chicken caecal microbiome is unknown. Efforts are made to control this pathogen at the farm and some in-feed control measures are showing encouraging results. Modifications of the chicken intestinal microbiome by these measures are often hypothesized as part of their mechanism of action. In this study, 4 groups of 15 chickens were used. Chickens received or not a feed additive, based on a protected mix of organic acids and essential oils, tested as a *C.jejuni* control option, from hatch to the end of the experiment. Fourteen days old chickens were then infected or not with *C.jejuni*. Birds were euthanized at 35 days of age. Caecal content from each chicken was recovered. *C.jejuni* caecal levels were determined by culture on mCCDA. DNA was also extracted to perform in-depth microbiome analysis. Levels of *C.perfringens*, *E.coli*, lactobacillis, enterobacteria and *Bifidobacterium* were evaluated by real time PCR. In each group, DNA from 8 chickens was subjected to 16S rDNA sequencing using the Ion Torrent technology. Sequences analysis was performed with Mothur and the Greengenes database. The feed additive lowered the *C.jejuni* presence in the chicken caecum by 0.6 log. *C.jejuni* colonization was associated with increased *Bifidobacterium* levels. Alpha-diversity was not much affected by *C.jejuni* presence but beta-diversity was. The relative abundance of the phylum composing the caecal microbiome of *C.jejuni* colonized chickens was different than the one composing the *C.jejuni* negative birds but this change was unexpectedly mild. The feed additive did not impact the chicken caecal microbiome diversity but lowered *Streptococcus* relative abundance. Overall, these results show that *C.jejuni* does not greatly disturb the chicken caecal microbiome and that the feed additive impacted *C.jejuni* counts with no effects on the caecum diversity.