

1 EVALUATION OF IN VITRO AND IN VIVO EQUINE MICROBIAL POPULATION
2 SHIFTS IN RESPONSE TO COLIC CONDITIONS

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8 Abstract

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10 We designed two continuous culture experiments to test the effects of starch
11 dosage and starvation upon equine fecal microflora. Diets were designed containing
12 fructooligosaccharides and mannanoligosaccharides in order to investigate treatment
13 effects on VFA and NH₃ concentration, and pH following starvation or starch overload.

14 This research indicated that total volatile fatty acid (VFA) concentration may be
15 affected by treatment following starch overload. Additionally, branched chain VFA, and
16 butyric acid concentrations were different across treatment in both experiments. This
17 research indicated that following an abrupt change in the starch content of the diet, or a
18 starvation period, those effects may be ameliorated by diet.

19 In our third experiment, we performed pyrosequencing in order to
20 phylogenetically characterize the shifts in the microbial populations observed in the feces
21 of eight horses collected from both the colic (large intestinal-nonsurgical) and healthy
22 states. Healthy samples were collected by the attending/referring veterinarian 60 days (\pm
23 30) post discharge. DNA was extracted from the fecal samples and the V1, V2, and V3
24 region of the 16S rDNA was amplified via emulsion PCR.

25 When ubiquitous microbes were ranked colic > healthy, four were significant. All
26 sick horses had greater reads of *Clostridium phytofermentans*, an uncultured *Clostridiales*
27 bacterium, and *Bacteroidetes* as well as an uncultured *bacteroidetes* bacterium. These
28 data suggest there is a need for broad bacterial diversity in the healthy equine gut.