

## Oral Administration of *Lactobacillus amylovorus* Alleviates Diarrhea and Partially Restores Gut Microbiota in Neonatal Goats

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### Abstract

Neonatal goat (kid) diarrhea is an important health and economic concern for small-scale ruminant farms. The curative properties of *Lactobacillus amylovorus* as a treatment for kids with diarrhea and its effect on the composition of the gut microbiota were investigated in this study. Eight children with diarrhea were given *Lactobacillus amylovorus* orally. We tracked gut microbial profiles, fecal consistency, and clinical symptoms. Using the Illumina HiSeq 2500 platform, 16S rRNA gene sequencing was performed on fecal samples. OTU clustering, taxonomic assignment, and alpha and beta diversity indices were used to examine the diversity and composition of microorganisms. Probiotic-treated kids all recovered properly from diarrhea in two weeks, while their untreated counterparts showed signs of clinical deterioration and gradual emaciation. With high-quality coverage across all samples, sequencing produced more than a million reads. 271 of the 8,519 OTUs that were found were shared by the groups. Children with diarrhea had far lower microbial richness, according to alpha diversity analysis, and this was only partially recovered after probiotic medication. Significant differences were observed in the Chao1, ACE, and Shannon indices between the treated and diarrheal groups ( $p < 0.05$ ); however, there was no discernible group split in beta diversity. The healthy group had a higher abundance of *Verrucomicrobiota*, while *Firmicutes* and *Bacteroidota* predominated in all groups. While *Bacteroides* and *Akkermansia* predominated in the healthy and treated groups, at the genus-level analysis showed elevated levels of *Escherichia-Shigella* and *UCG-005* in children with diarrhea. In newborn goats, oral administration of *Lactobacillus amylovorus* successfully reduced diarrhea and partially restored gut microbial equilibrium. These results lend credence to its potential as a probiotic treatment for small ruminant enteric disease.

**Key Words:** Goat, *Lactobacillus amylovorus*, Probiotic, Gut microbiota