Effects of Silage Diet on Meat Quality Through Shaping Gut Microbiota in Finishing Pigs

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With the increasing requirement for high-quality pork, green and healthy feed for finishing pigs is in urgent need of development. However, there is a serious problem that people and animals compete for food. Therefore, developing non-traditional feed is essential. In the present study, mulberry and paper mulberry as unconventional resources of feed were made into silage to explore the effects of mulberry silage and paper mulberry silage feed on growth performance and meat quality of finishing pigs. Furthermore, intestinal microbes and short chain fatty acids (SCFAs) were analyzed to clarify the influence and mechanism of silage feed on the growth performance, meat quality and intestinal health of finishing pigs. The results of the study indicated that the meat quality of pork marbling and fatty acid in longissimus dorsi muscle was better in mulberry silage group. The concentration of SCFAs in mulberry silage group was the highest. 16S rRNA sequencing demonstrated that *Clostridium-sensu-stricto-1*, *Terrisporobacte* and *Lachnospiraceae* which play important roles in SCFAs production served as the biomarker of mulberry silage group. PICRUSt function analysis of intestinal microbes showed that most of the microbes in the control group were involved in galactose, pentose phosphate, starch, sucrose, glycolysis metabolism, while most of the microbes in the two silage groups were involved in vitamin B6, phenylalanine, arginine and proline, propanoate metabolism and lysine degradation, indicating that protein and soluble saccharide were already degraded during silage production and intestinal microbes in the two silage groups were mainly function in amino acids metabolism and SCFAs production. Correlation analysis of intestinal microbes with SCFAs and fatty acids demostrated that *Clostridium-sensu-stricto-1*, *Terrisporobacte* and *Lachnospiraceae* were closely related with the content of SCFAs and fatty acids. As SCFAs can regulate the synthesis of fatty acids, the results in present study indicated that mulberry silage could increase the content of intestinal SCFAs by shaping intestinal microbes, affecting the deposition of muscle fatty acids, thereby improving meat quality. This study provided a theoretical basis for the application of mulberry silage in finishing pigs, which was of great significance to elucidate the regulatory network of pork fatty acids deposition, laying a solid theoretical foundation for improving pork quality, and provide strategies for exploring new feed resources.

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