

Effect of Alfalfa Silage & Alfalfa Meal Diets on Meat Quality of Finishing Pigs by Shaping Intestinal Microbiota

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With the development of living standards, the demand for pork quality is getting increasingly high. Alfalfa meal is one kind of high quality fiber diet that is applied more and more on pigs, but alfalfa silage is less applied so far. The aim of this study was to investigate the effects of different alfalfa diets on meat quality of finishing pigs by adding non-conventional forage alfalfa silage and conventional forage alfalfa meal. To elaborate the effects of alfalfa silage and alfalfa meal on meat quality, the intestinal microbiota of finishing pigs and the correlation study by analyzing intestinal microbiota and short-chain fatty acids (SCFA_s) were investigated. The results showed that the alfalfa silage and alfalfa meal groups not only improved the water-holding capacity and marbling of pork, but also changed the fatty acid composition of the longissimus dorsi muscle thus improving pork quality. The highest content of SCFA_s in colonic content was found in the alfalfa silage group. Sequencing of the 16s RNA gene showed that *Terrisporobacter*, unclassified family *Peptostreptococcaceae* was the marker flora of both the alfalfa silage group and the alfalfa meal group; *Clostridium_sensu_stricto_1* was the hallmark flora in the alfalfa meal group. PICRUSt functional analysis also showed that the gut microbes in the control group were mostly involved in Lipoarabinomannan (LAM) biosynthesis pathways, while the gut microbes in the alfalfa silage and alfalfa meal groups were mainly involved in protein metabolic pathways and inflammatory signaling pathways. Correlation analysis of intestinal microbiota with SCFA_s and fatty acids showed that *Terrisporobacter*, unclassified family *Peptostreptococcaceae* was closely associated with SCFA_s and fatty acids. SCFA_s can act as signaling molecules to regulate the synthesis and metabolism of fatty acids. This study showed that feeding alfalfa diets (alfalfa meal and alfalfa silage) to finishing pigs could improve meat quality and affect the production and deposition of muscle fatty acids by remodeling intestinal microorganisms and increasing the amount of SCFA_s-producing and beneficial bacteria. The feasibility of the application of alfalfa silage on finishing pigs was demonstrated in this study, providing a theoretical basis for the application of alfalfa feeds.

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