

Effects of Fermented *Acer truncatum* Leaves on Meat Quality and Gut Microbiota in Finishing Pigs (Postprint)

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Date: 2018-12-20T15:15:11+00:00

Abstract

This experiment aimed to investigate and compare the effects of fermented and unfermented *Acer truncatum* leaves on the production performance, meat quality, and gut microbiota of fattening pigs. Forty-eight fattening pigs with similar body weight (half male and half female) were randomly divided into 3 groups, with 4 replicates per group and 4 pigs per replicate. The control (CON) group was fed a basal diet, while the unfermented *Acer truncatum* leaves (UFA) group and fermented *Acer truncatum* leaves (FA) group were fed diets in which 12% unfermented *Acer truncatum* leaf powder and fermented *Acer truncatum* leaf powder, respectively, replaced an equal amount of wheat bran in the basal diet. The pre-trial period was 7 days, and the formal trial period was 63 days. The results showed that: 1) Compared with the control group, the average daily gain (ADG) and muscle redness value of fattening pigs in the unfermented *Acer truncatum* leaves group and fermented *Acer truncatum* leaves group were significantly increased ($P < 0.05$), and muscle shear force was significantly decreased ($P < 0.05$); the redness value in the fermented *Acer truncatum* leaves group was significantly increased compared with the unfermented *Acer truncatum* leaves group ($P < 0.05$); the water-holding capacity of the fermented *Acer truncatum* leaves group was significantly higher than that of the control group and the unfermented *Acer truncatum* leaves group ($P < 0.05$). 2) Compared with the control group, the contents of linolenic acid, arachidonic acid, monounsaturated fatty acids (MUFA), polyunsaturated fatty acids (PUFA), and the PUFA/SFA ratio in the muscle of fattening pigs in the fermented *Acer truncatum* leaves group were significantly increased ($P < 0.05$), while the contents of stearic acid, arachidic acid, and saturated fatty acids (SFA) were significantly decreased ($P < 0.05$); the contents of linolenic acid and MUFA in the fermented *Acer truncatum* leaves group were significantly higher than those in the unfermented *Acer truncatum* leaves group ($P < 0.05$). 3) Compared with the control group and the

unfermented *Acer truncatum* leaves group, the number of *Escherichia coli* in the rectal contents of fattening pigs in the fermented *Acer truncatum* leaves group was significantly decreased ($P < 0.05$), while the number of *Lactobacillus* was significantly increased ($P < 0.05$). In conclusion, dietary supplementation with fermented *Acer truncatum* leaves can improve the production performance, meat quality, and gut health of fattening pigs to a certain extent.

Full Text

Effect of Fermented *Acer Truncatum* Leaves on Meat Quality and Intestinal Microflora of Finishing Pigs

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Abstract

This experiment was conducted to investigate and compare the effects of *Acer truncatum* leaves before and after fermentation on the performance, meat quality, and intestinal microflora of finishing pigs. Forty-eight finishing pigs (half male and half female) with similar body weight were randomly assigned to three groups, with four replicates per group and four pigs per replicate. The control (CON) group was fed a basal diet, while the unfermented *Acer truncatum* leaves (UFA) and fermented *Acer truncatum* leaves (FA) groups received diets in which 12% unfermented or fermented *Acer truncatum* leaf powder replaced an equivalent amount of wheat bran in the basal diet. The pre-trial period lasted 7 days, followed by a 63-day formal experimental period.

The results showed: 1) Compared with the control group, both the UFA and FA groups exhibited significantly increased average daily gain (ADG) and muscle redness values ($P < 0.05$), along with significantly decreased muscle shear force ($P < 0.05$). The redness value in the FA group was significantly higher than that in the UFA group ($P < 0.05$), and the water holding capacity in the FA group was significantly higher than in both the control and UFA groups ($P < 0.05$). 2) Compared with the control group, the FA group showed significantly increased contents of linolenic acid, arachidonic acid, monounsaturated fatty acids (MUFA), polyunsaturated fatty acids (PUFA), and the PUFA/saturated fatty acid (PUFA/SFA) ratio in muscle ($P < 0.05$), while stearic acid, arachidic acid, and saturated fatty acid (SFA) contents were significantly decreased ($P < 0.05$). The linolenic acid and MUFA contents in the FA group were significantly higher than those in the UFA group ($P < 0.05$). 3) Compared with the control and UFA groups, the FA group exhibited significantly reduced *Escherichia coli* counts and significantly increased *Lactobacillus* counts in rectal contents ($P < 0.05$). In conclusion, dietary supplementation with fermented *Acer truncatum* leaves can improve the fatty acid composition of muscle and intestinal microflora, and to

some extent enhance the performance, meat quality, and intestinal health of finishing pigs.

Keywords: fermented *Acer truncatum* leaves; pigs; meat quality; fatty acids; intestinal microflora

Introduction

With the continuous improvement of living standards in China, consumers increasingly demand higher quality meat products. As pork is a daily staple for Chinese residents, its quality and safety largely depend on feed safety conditions. While dietary antibiotics can significantly improve pig performance and nutrient utilization efficiency [?], they also cause problems such as antibiotic residues in pork products and environmental pollution [?]. Therefore, developing non-polluting, residue-free feed or feed additives with disease-prevention and growth-promotion functions to replace antibiotics is of great practical significance for improving pork quality and safety.

In recent years, to reduce antibiotic use, microbial fermentation of plant-based feed has become a research focus in animal production both domestically and internationally. Numerous studies on pigs and chickens have shown that microbially fermented plants contain bioactive components that promote animal growth, improve feed conversion rates, enhance palatability [?], modify intestinal microflora structure [?], improve muscle fatty acid composition and meat quality, and extend shelf life [?]. *Acer truncatum* is a deciduous tree belonging to the Aceraceae family. Its leaves are rich in nutrients, with amino acid content reaching 11.79%, making them a high-quality protein resource. The leaves also contain bioactive components such as total flavonoids, chlorogenic acid, organic acids, tannins, cardiac glycosides, terpenes, and phenols, with relatively high contents of total flavonoids and chlorogenic acid [?]. Currently, research on *Acer truncatum* leaf bio-feed in animal nutrition is limited. Therefore, this study explored the utilization of *Acer truncatum* leaves as an excellent protein resource while leveraging its unique natural active substances such as flavonoids, chlorogenic acid, and polysaccharides to improve animal meat quality. This experiment, for the first time, investigated the effects of adding fermented *Acer truncatum* leaves to finishing pig diets on performance, meat quality, and intestinal microflora, and compared these effects with unfermented leaves to provide a theoretical basis for the application of *Acer truncatum* leaf bio-feed in finishing pigs.

1.1 Preparation and Analysis of Fermented *Acer Truncatum* Leaves

The main preparation steps for fermented *Acer truncatum* leaves included: preparation of nutrient salt solution, solid culture medium, and fermentation medium; inoculation and fermentation with *Candida utilis* (purchased from

China General Microbiological Culture Collection Center, ACCC2060) and *Aspergillus niger* NL-1 (purchased from China General Microbiological Culture Collection Center, ACCC30005) (both strains preserved in Laboratory 2304, College of Chemical Engineering, Nanjing Forestry University); drying and powdering.

The specific procedures were as follows: 1) Nutrient salt solution was prepared to contain 2 g glucose, 3 g urea, 2 g potassium dihydrogen phosphate, and 0.5 g magnesium sulfate heptahydrate per 100 mL, with pH adjusted to 5.0. 2) Solid culture medium was prepared at a ratio of *Acer truncatum* leaf powder:wheat bran:soybean meal = 8:1:1. 3) Fermentation medium was prepared by adding 11 mL of nutrient salt solution to every 10 g of solid culture medium, then sterilized at 121 °C for 50 min. 4) The fermentation medium was first inoculated with *C. utilis* using seed liquid culture method (1.2 mL per 10 g medium) and cultured at 28 °C with 150 r/min shaking for (12 ± 1) h; then *A. niger* was inoculated at the same ratio and cultured at (28 ± 1) °C for (36 ± 1) h. Fermentation was conducted using conventional methods. 5) Fermented material was dried at temperatures below 40 °C and powdered to obtain fermented *Acer truncatum* leaf samples. 6) Four unfermented and four fermented *Acer truncatum* leaf samples were randomly selected for analysis of active component contents. Total flavonoids and chlorogenic acid were determined by spectrophotometry using rutin as standard, crude protein by Kjeldahl method, true protein by copper sulfate precipitation method, and amino acids by liquid chromatography.

1.2 Experimental Design and Animals

This experiment employed a single-factor randomized design. Forty-eight “Duroc × Landrace × Yorkshire” finishing pigs (half male and half female, all castrated) with similar parity, initial body weight $[(55.20 \pm 1.40)$ kg], and age were randomly allocated to three groups with four replicates per group and four pigs per replicate. The control (CON) group received the basal diet, while the UFA and FA groups received diets in which 12% unfermented or fermented *Acer truncatum* leaf powder replaced an equivalent amount of wheat bran in the basal diet. The pre-trial period lasted 7 days, followed by a 63-day formal experimental period.

1.3 Experimental Diets and Management

The measured metabolizable energy values of *Acer truncatum* leaves before and after fermentation were 8.87 and 9.38 MJ/kg, respectively. The basal diet was formulated in powder form according to NRC (2012) guidelines, with composition and nutrient levels shown in Table 1 .

Before the experiment, pig houses were disinfected, pigs were weighed and assigned to groups. Routine management procedures for deworming and vaccination were followed. Pigs were fed three times daily with ad libitum access to feed and water. All experimental pigs were housed in the same building,

with each replicate separated in identical pens under consistent management conditions. No immunizations were administered during the trial, and no mortality occurred. One day before the experiment ended, feed was restricted; on the final day, all pigs were weighed and stunned with an electric rod (110 V, 5 A) before exsanguination via carotid artery suspension, completing the process within 30 s to minimize suffering. After corneal reflexes ceased, carcass traits were measured and *longissimus dorsi* muscle samples were collected for meat quality analysis.

Table 1 Composition and nutrient levels of basal diets (air-dry basis)

Items	Groups
Ingredients	
Corn	
Wheat bran	
Soybean meal	
Limestone	
Unfermented Acer truncatum leaves	
Fermented Acer truncatum leaves	
CaHPO ₄	
L-Lys · HCl	
NaCl	
Premix ¹	
Total	
Nutrient levels²	
ME/(MJ/kg)	
Crude protein CP	
Available phosphorus AP	
Lysine Lys	
Methionine Met	

¹Premix provided the following per kg of diets: VA 6,000 IU, VB₁ 2 mg, VB₂ 4 mg, VB₅ 10 mg, VB₆ 31 mg, VB₁₂ 1 mg, VD₃ 800 IU, VE 20 IU, VK₃ 2 mg, biotin 0.02 mg, folic acid 20 mg, D-pantothenic acid 11 mg, nicotinic acid 10 mg, Cu (as copper sulfate) 21 mg, Fe (as ferrous sulfate) 100 mg, Mn (as manganese sulfate) 90 mg, Zn (as zinc sulfate) 60 mg, I (as potassium iodide) 1 mg, Se (as sodium selenite) 0.30 mg.

²Nutrient levels were calculated values.

1.4 Measurements and Methods

1.4.1 Performance All pigs were weighed on an empty stomach on days 1, 28, and 63 of the experiment. Feed intake and residual feed for each replicate were accurately recorded to calculate average daily gain (ADG), average daily feed intake (ADFI), and feed-to-gain ratio (F/G).

1.4.2 Carcass Traits At the end of the experiment, one pig with body weight close to the replicate average was selected from each replicate (four pigs per group) for blood collection, weighing, and slaughter. After exsanguination, scalding, and dehairing, carcasses were split. Dressing percentage and average backfat thickness were measured according to the “Technical Regulations for Performance Testing of Lean-type Breeding Pigs” (GB 8467—87). Loin eye area was determined following the method of Wu Liyang [?] (drawing the loin eye contour on tracing paper with pencil, measuring height and width, then calculating area using the formula: height \times width \times 0.7).

1.4.3 Meat Quality The left-side *longissimus dorsi* muscle at the last rib was collected, surface blood was blotted dry, and samples were stored in self-sealing bags for meat quality and nutrient composition analysis. Muscle pH was measured using a testo 205 pH meter, shear force with a Salter shear force instrument, water holding capacity with a PY-1 expansion-compression meter, and color parameters (L, a, b*) with a colorimeter. Crude protein content in muscle was determined following Zhou Gui’s method [?], crude fat content according to “Technical Specification for Pork Quality Measurement” (NY/T 821—2004) [?], and fatty acid content according to “Determination of Total Fat, Saturated Fatty Acids, and Unsaturated Fatty Acids in Foods” (GB/T 22223—2008) [?].

1.4.4 Rectal Fecal Microflora Counts After slaughter, rectal fecal samples were aseptically collected. *Escherichia coli* was cultured on MacConkey agar and *Lactobacillus* on de Man, Rogosa and Sharpe (MRS) medium, with bacterial counts performed using the plate colony counting method.

1.5 Statistical Analysis

Experimental data were expressed as means and standard errors. One-way ANOVA was performed using SPSS 19.0 software, with Duncan’s multiple comparison test for significance testing at $P < 0.05$.

2.1 Changes in Main Nutrient Composition of Acer truncatum Leaves Before and After Fermentation

As shown in Table 2, compared with unfermented leaves, fermented *Acer truncatum* leaves showed decreased contents of total flavonoids ($P > 0.05$), chlorogenic acid ($P > 0.05$), and total sugar ($P < 0.05$), with crude fiber content reduced by 60.60% ($P < 0.05$). Crude protein, true protein, reducing sugar, total amino acids, and total essential amino acids increased by 73.54%, 67.63%, 131.30%, 21.20%, and 14.74%, respectively ($P < 0.05$).

Table 2 Changes in main nutrient contents of *Acer truncatum* leaves before and after fermentation (%)

Items	Before fermentation	After fermentation	P-value
Moisture	11.38 (air-dried)	11.68 (rehydrated after drying)	0.23
Ether extract			
Crude fiber			
Ash			
Total flavonoids			
Chlorogenic acid			
Crude protein			
True protein			
Total sugar			
Reducing sugar			
Total amino acids			
Total essential amino acids			

Values in the same row with different small letter superscripts indicate significant differences ($P < 0.05$). The same applies below.

2.2 Effects of Fermented Acer Truncatum Leaves on Performance of Finishing Pigs

As shown in Table 3, compared with the control group, the UFA and FA groups showed increased ADG by 3.03% and 2.65% during days 1–28, 1.98% and 3.63% during days 29–63, and 2.51% and 3.14% during days 1–63, respectively ($P < 0.05$). No significant difference in ADG was observed between the FA and UFA groups ($P > 0.05$). No significant differences were found in ADFI or F/G among all groups ($P > 0.05$).

Table 3 Effects of dietary fermented *Acer truncatum* leaves on performance of finishing pigs

Items	Groups			P-value
	Control	Unfermented	Fermented	
Body weight (BW)/kg				
Day 1				
Day 28				
Day 63				
Days 1–28				
ADG/g	754.00	777.00	774.00	
ADFI/g				
F/G				
Days 29–63				
ADG/g	866.00	883.00	897.00	
ADFI/g				
F/G				

Items	Groups			P-value
Days 1–63				
ADG/g	810.00	830.00	835.00	
ADFI/g				
F/G				

2.3 Effects of Fermented *Acer truncatum* Leaves on Meat Quality of Finishing Pigs

As shown in Table 4, dietary supplementation with fermented *Acer truncatum* leaves had no significant effects on dressing percentage, average backfat thickness, loin eye area, muscle lightness, yellowness, pH, intramuscular fat, or crude protein content ($P > 0.05$). Compared with the control group, both UFA and FA groups showed significantly decreased muscle shear force ($P < 0.05$) and increased redness values ($P < 0.05$). The redness value in the FA group was significantly higher than that in the UFA group ($P < 0.05$). The water holding capacity in the FA group was significantly higher than in both the control and UFA groups ($P < 0.05$).

Table 4 Effects of dietary fermented *Acer truncatum* leaves on meat quality of finishing pigs

Items	Groups			P-value
	Control	Unfermented	Fermented	
Dressing percentage/%				
Average backfat thickness/mm				
Loin eye area/cm ²				
Lightness L*				
Redness a*	11.74	32.15	18.34	
Yellowness b*				
pH _{45 min}				
pH _{24 h}				
Intramuscular fat/%				
Crude protein/%				
Shear force/N	12.99	26.33	14.86	
Water holding capacity/%	18.62	24.73	21.00	

2.4 Effects of Fermented *Acer truncatum* Leaves on Muscle Fatty Acid Content of Finishing Pigs

As shown in Table 5, compared with the control group, dietary supplementation with fermented *Acer truncatum* leaves significantly increased linolenic acid, arachidonic acid, MUFA, PUFA contents, and the PUFA/SFA ratio in muscle

($P < 0.05$). The linolenic acid and MUFA contents in the FA group were significantly higher than those in the UFA group ($P < 0.05$). Compared with both the control and UFA groups, the FA group showed significantly decreased stearic acid and arachidic acid contents ($P < 0.05$). The SFA content in the FA group was significantly lower than that in the control group ($P < 0.05$).

Table 5 Effects of dietary fermented *Acer truncatum* leaves on muscle fatty acid contents of finishing pigs (%)

Items	Groups			P-value
	Control	Unfermented	Fermented	
Myristic acid (C14:0)				
Palmitic acid (C16:0)				
Palmitoleic acid (C16:1)				
Stearic acid (C18:0)	12.48	11.13	9.89	
Oleic acid (C18:1)				
Linoleic acid (C18:2)				
Linolenic acid (C18:3)	0.86	0.89	1.43	
Arachidic acid (C20:0)	0.42	0.38	0.28	
Arachidonic acid (C20:1)	0.78	0.93	1.16	
SFA	40.24	38.31	34.74	
MUFA	52.77	53.65	55.85	
PUFA	6.99	8.04	9.46	
PUFA/SFA	1.49	1.61	1.88	

2.5 Effects of Fermented *Acer truncatum* Leaves on Rectal Microflora of Finishing Pigs

As shown in Table 6, dietary supplementation with fermented *Acer truncatum* leaves significantly affected rectal microflora. Compared with the control and UFA groups, the FA group showed 14.93% and 14.58% reductions in *E. coli* counts ($P < 0.05$), and 19.77% and 15.64% increases in *Lactobacillus* counts ($P < 0.05$), respectively.

Table 6 Effects of dietary fermented *Acer truncatum* leaves on rectal contents microflora of finishing pigs (lg CFU/g)

Items	Groups			P-value
	Control	Unfermented	Fermented	
<i>E. coli</i>	7.69	7.66	6.54	
<i>Lactobacilli</i>	8.15	8.44	9.76	

3.1 Changes in Main Nutrient Composition of Acer Truncatum Leaves Before and After Fermentation

Microbial fermentation has been established as a productive process and an effective means of generating health-promoting biological substances. Fermentation can alter the original bioactive components and nutrient composition of herbal medicines, with fermented herbs being rich in vitamins, enzymes, and growth factors [?]. *Acer truncatum* leaves are abundant in total flavonoids, polysaccharides, chlorogenic acid, and other substances. Total flavonoids are a class of phenolic compounds whose biological effects derive from their aglycones [?], which can be more easily and rapidly absorbed by the intestine after fermentation [?]. In this experiment, fermented *Acer truncatum* leaves showed significantly higher contents of crude protein, reducing sugar, total amino acids, and total essential amino acids than unfermented leaves. The increased crude protein content can be attributed to bacterial growth and proliferation, enzyme secretion (all enzymes being proteins), and the release of chelated or bound proteins through decomposition [?]. The increase in reducing sugar content may result from increased carbohydrate content after fermentation [?]. However, the slight decrease in total flavonoids after fermentation suggests that β -glucosidase from *A. niger* may have converted flavonoids into aglycones during fermentation, and the resulting aglycones of different glycosides may be the bioactive components responsible for the beneficial effects observed in this experiment [?]. The increases in total amino acids and total essential amino acids are beneficial, as amino acid content and composition are the main determinants of protein nutritional value; higher essential amino acid content in muscle indicates higher protein nutritional value [?].

3.2 Effects of Fermented Acer Truncatum Leaves on Performance of Finishing Pigs

In this experiment, compared with the control group, both unfermented and fermented *Acer truncatum* leaves significantly increased ADG in finishing pigs. The improved performance may be attributed to increased contents of protein, reducing sugar, amino acids, and other active substances after fermentation. Qiao Yanming et al. [?] studied the effects of multi-strain fermented diets on finishing pig performance and found that ADG in the multi-strain fermented diet group was 5.3% and 5.6% higher than in two conventional diet groups, consistent with our results. No significant differences in ADFI or F/G among groups may be due to minimal differences in diet flavor and palatability.

3.3 Effects of Fermented Acer Truncatum Leaves on Meat Quality of Finishing Pigs

Pork eating quality is a primary concern for consumers and producers, with tenderness, color, and water-holding capacity being important quality indicators. Deterioration in pork quality is largely caused by extensive lipid peroxidation in post-slaughter muscle, which damages cell membranes, resulting in

decreased tenderness, pale color, and reduced water-holding capacity [?]. Our results showed that the FA group had significantly higher water-holding capacity than the other two groups, indicating that fermented *Acer truncatum* leaves can improve pork juiciness and taste. This may be because flavonoids prevent oxidation of phospholipids on muscle cell membranes, maintaining membrane integrity and reducing myoplasm loss, thereby improving water-holding capacity [?]. Pork tenderness reflects meat texture and can be measured by shear force; higher shear force indicates tougher meat and poorer taste [?]. In this experiment, both UFA and FA groups showed significantly lower shear force than the control group, with the FA group having the lowest shear force, indicating improved tenderness. Meat color is consumers' most direct selection criterion for pork appearance, with bright red pork generally considered better quality [?]. Our study found that the FA group had significantly higher redness values than both the control and UFA groups. Redness value indicates myoglobin conversion to metmyoglobin in fresh meat cuts, and the antioxidant effect of flavonoids can delay this reaction.

3.4 Effects of Fermented *Acer truncatum* Leaves on Muscle Fatty Acid Content of Finishing Pigs

Fatty acids are important chemical components of fat. Intramuscular fat oxidation generates free radicals, leading to rancidity and off-odors [?]. Unsaturated fatty acids (UFA) ensure normal physiological cell functions, improve blood microcirculation, and enhance memory and cognitive ability. As living standards improve, consumers increasingly desire more UFA from food [?]. Plant polyphenol flavonoids, as antioxidants, are a major group of compounds that terminate free radical reactions, participating in cellular antioxidant systems and synergizing with other antioxidants [?]. Havsteen [?] noted that flavonoids in cell membranes can protect UFA from oxidation like vitamin C, supporting our results. In this experiment, dietary fermented *Acer truncatum* leaves significantly increased MUFA, PUFA contents, and PUFA/SFA ratio in finishing pig muscle. The decreased SFA content resulted from significantly reduced stearic and arachidic acids, while increased PUFA content was due to significantly increased linolenic and arachidonic acids. This may be related to peroxidase scavenging enzyme activity, which can reduce total unsaturated fatty acid oxidation. These results demonstrate that dietary fermented *Acer truncatum* leaves can increase UFA content and alter fatty acid composition, thereby improving pork quality.

3.5 Effects of Fermented *Acer truncatum* Leaves on Intestinal Microflora of Finishing Pigs

Studies have shown that fermented feed can improve diet palatability, modify gastrointestinal microflora [?], and enhance feed nutrient decomposition, digestion, absorption, and utilization [?]. Research indicates that fermenting herbs with *Candida* or *Aspergillus oryzae* produces abundant hydrolytic enzymes (such as cellulase, maltase, protease) that enhance digestive enzyme activity, improve

gastrointestinal systems, and promote health in weaned piglets, thereby increasing nutrient digestibility [?]. Zhang Nana et al. [?] found that fermented mulberry leaf powder reduced crude fiber content, increased protein content, and generated abundant probiotics during fermentation, regulating livestock gastrointestinal microflora and improving immune function and disease resistance. These findings support our results. Intestinal microflora is an important component of the digestive system, with *Lactobacillus* and *E. coli* commonly used as representative bacteria in studies of piglet and growing-finishing pig intestinal microflora. Their viable counts are closely related to pig health; diarrhea in piglets and finishing pigs causes significant changes in intestinal microflora, mainly manifested by increased *E. coli* and decreased *Lactobacillus* [?]. *Lactobacillus* can enhance animal immunity and is a beneficial bacterial group. Our results showed that compared with the control and UFA groups, the FA group had significantly reduced *E. coli* counts and significantly increased *Lactobacillus* counts in rectal contents. This phenomenon may be due to fermentable fiber stimulating microbial fermentation in the hindgut, producing lactic acid and volatile fatty acids that inhibit growth of intestinal pathogens such as *E. coli* and *Salmonella* [?]. Additionally, Liang Ying et al. [?] found that Scutellaria flavonoids significantly inhibited *E. coli* and *Salmonella* while promoting *Lactobacillus* in broiler intestines, further supporting our findings. Fermented Acer truncatum leaves improved finishing pigs' immune function and disease resistance by regulating intestinal microflora, thereby enhancing performance.

4 Conclusion

Dietary supplementation with fermented Acer truncatum leaves can improve the fatty acid composition of muscle and intestinal microflora, and to some extent enhance the performance, meat quality, and intestinal health of finishing pigs.

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