PE1.30 Effect of feeding stevia and charcoal on growth performance, carcass characteristics and meat quality measurements of market pigs 221.00

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Abstract This study was conducted to determine the effect of feeding stevia and charcoal on growth performance, carcass characteristics and meat quality traits of market pigs. A total of 180 pigs(LYD) were randomly allocated into 3 treatments with 3 replications. Dietary treatments were 1) Control (basal diet), 2) T1(basal diet + 0.3% stevia + 0.3% charcoal) and 3) T2 (basal diet + 0.6% stevia + 0.6% charcoal). During entire experimental period, body weight and feed consumption for growth performance were measured weekly. When the mean weight of pigs in a pen reached market weight, pigs were conventionally slaughtered and then chilled overnight. At 24h postmortem, carcass measurements and carcass grading were collected. Then, the longissimus muscle from left side between the 5th and 13th rib was removed and meat qualities were evaluated. Feeding stevia and charcoal had no effect (p>0.05) on growth performance including finish weight, average daily gain, average daily feed intake and feed conversion ratio of pigs. Carcass characteristics such as hot carcass weight, backfat thickness and carcass length did not differ (p>0.05) among treatments while feeding stevia and charcoal (T1 and T2) showed higher incidence of carcass A grade compared to control. In the meat quality traits, T1 group (0.3% stevia + 0.3% charcoal) showed higher pH(p<0.05), lower(p<0.05) cooking loss and shear force values than control. In the meat color, T1 group showed higher Hunter L*(p<0.05), a* and b*(p<0.05) values than control to result in redder surface meat color. In the subjective evaluation, marbling, firmness and color scores were improved in T1 group compared to control. In the panel test, T1 and T2 groups showed higher tenderness, juiciness and flavor scores compared to control. These results showed that incidence of carcass A grade and meat quality traits were improved by feeding of 0.3% stevia and 0.3% charcoal in market pigs.

Key words : Stevia and charcoal, Growth, Carcass, Pork quality

I.INTRODUCTION

The quality attributes of fresh pork has become important to pork producers and consumers in Korea. Pork quality traits are often truly composite traits, being influenced by several antemortem and postmortem factors(Honikel, 1993). Both the stevia plant(Stevia rebaudiana Bertoni), its extracts and stevioside have been used for several years as a sweetener in South America, Asia and in different countries of the EU(Mizutani and Tanaka, 2002; Kim et al., 2002). As a feed supplementation, stevioside did not show any adverse effects on growth, feed uptake or feed conversion of broiler chickens or laying hens(Wood et al., 1996; Geuns et al., 2003). In the above experiments, no indications of any influence on the bio-availability of nutrients, nor on physiological effects were found. Charcoal is often included in commercial mineral mixtures and is frequently added to concentrate mixture, especially for swine and poultry. The use of charcoal in animal feeding is also recommended as a treatment for diarrhea and as an adsorbent of gases and detrimental products in the gastro-intestinal tract(Cowie, 1964; Buck and Bratich, 1986). However, the effects of dietary stevia and charcoal supplementation on growth performance, carcass characteristics and meat quality of pigs were not clearly investigated yet. The objective of this study was to investigate effect of feeding stevia and charcoal on growth performance, carcass characteristics and meat quality measurements of market pigs.

II.MATERIALS AND METHODS

A total of 180 pigs(LYD) were randomly allocated into 3 treatments with 3 replications. Dietary treatments were 1) Control (basal diet), 2) T1(basal diet+0.3% stevia+0.3% charcoal) and 3) T2(basal diet+0.6% stevia+0.6% charcoal). Pigs were housed in half-slotted concrete floored pen and were

allowed ad libitum access to water and diet during entire experimental period. Body weight and feed consumption for growth performance were measured weekly. When the mean weight of pigs in a pen reached market weight, pigs were conventionally slaughtered and then chilled overnight. At 24 h postmortem, carcass measurements including backfat thickness, carcass length and carcass grading evaluated by Animal Products Grading Service (2001) were collected. Then, the longissimus muscle from left side between the 5th and 13th rib was removed and meat qualities were evaluated. Proximal analyses including moisture, protein, fat and ash were measured according to AOAC (1995). The pH value was measured with a pH meter(Mettler Delta 340, Mettler-Toledo,Ltd., UK). Water holding capacity was measured by centrifuging method (Kristensen and Purslow, 2001). A 2.5cm thick longissimus chop was wrapped and placed in a cooler for 48h for drip loss. For cooking loss, weights of uncooked and cooked chop (2.5 thick) were recorded and expressed as a percentage. After the chops cooled to room temperature, three 1.27cm diameter cores were taken from each chop parallel to the muscle fiber orientation. Peak shear force was measured using a Sun Rheometer (Compac-100, Sun Scientific Co. Ltd., Japan). Approximately 30min after exposing the fresh surface, Hunter L*, a* and b* values were measured at room temperature using Spectro Colormeter(Model JX-777, color Techno. System Co., Japan) which was calibrated with L*=89.39, a*=0.13, b*=-0.51. Subjective marbling, firmness and color scores were obtained using a 5-point hedonic scale (5=extremely abundant, firm, dark red ; 1=none, extremely soft, pale red) by trained panels. In addition, taste panels evaluated cooked longissimus chops for tenderness, juiciness and flavor using a 5-point hedonic scale(5= extremely tender, juicy, intense flavor ; 1=extremely tough, dry, scarce flavor). The results were analyzed statistically using the SAS statistical package(2002). Significant differences were analyzed by Duncan's Multiple range test at $p<0.05$.

III.RESULTS AND DISCUSSION

During the experimental period, feeding stevia and charcoal had no effect($p>0.05$) on finish weight of market pigs (Table 1). T1 group (0.3% stevia+0.3% charcoal) tended to show higher average daily gain compared to control, but there was no significant difference. Also, feeding stevia and charcoal had no effects ($p>0.05$) on average daily feed intake and feed conversion ratio of market pigs. Feeding stevia and charcoal had no effects($p>0.05$) on carcass measurements such as hor carcass weight, backfat thickness and carcass length of market pigs (Table 2). In the carcass grades, feeding stevia and charcoal (T1 and T2) showed higher incidence of carcass A grade compared to control. In the proximal analysis of longissimus muscle (Table 3), there were no significant differences in moisture, protein, fat and ash contents among treatments. In the meat quality traits, T1 group showed higher pH ($p<0.05$), water holding capacity, and lower drip loss, cooking loss ($p<0.05$) and shear force ($p<0.05$) values than control. In the meat color, T1 group showed higher Hunter L*($p<0.05$), Hunter a* and Hunter b* ($p<0.05$) values than control to result in redder surface meat color. In the subjective evaluation, marbling, firmness and color scores were higher ($p<0.05$) in T1 group compared to control. In the panel test, feeding stevia and charcoal (T1 and T2) showed higher tenderness, juiciness and flavor scores compared to control.

IV.CONCLUSION

Feeding stevia and charcoal did not show any adverse effects on growth performance and carcass characteristics of market pigs. However, incidence of carcass A grade and meat quality traits were improved by feeding of 0.3% stevia and 0.3% charcoal in market pigs.

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