BIBLIOGRAPHY

RAMOS, CHESTER B. APRIL 2012. The Effect of Aloe Vera Extract On the Carcass Yield and Quality of Broilers. Benguet State University La, Trinidad, Benguet.

Adviser: Madeline S. Kingan, Msc.

ABSTRACT

This study was conducted to find out the effect of aloe vera extract on the carcass yield and quality of broilers. Specifically, this study aimed to determine the effect of aloe vera extract on the carcass yield and quality of broilers, and to determine the effect on slaughter weight, carcass weight, and dressing percentage on the different major and minor cuts of broilers. An organoleptic evaluation was also done to assess the quality of carcasses produced under La Trinidad, Benguet.

The result of statistical analysis showed that aloe vera extract added to water as synthetic replacement had no effect in terms of the meat cuts as well as the organoleptic test of the cooked meat in each treatment.

It is therefore concluded that aloe vera supplementation is safe as it did not produce any detrimental effect on the carcass yield and sensory characteristics of broiler meat. It may be used by broiler raisers upon their own discretion.

INTRODUCTION

Broiler chicken is one of the most important animal protein sources for the people as the price is relatively achievable even for the poorer people. The growth of broiler chicken is relatively faster with a shorter life cycle compared with other meat-producing livestock. At the age of 5 to 6 weeks, broiler can reach slaughter weight of 1.5 to 2.0 kg. In terms of its quantity, broiler is generally raised in a large number from thousands to hundred thousand per farm per period of two months per period or six periods per year. Thus, broiler meat production is competitively to supply the demand for meat which increases continuously following the increase of human population and their requirement for high quality food. However, the use of some chemically based feed additives, such as antibiotics and growth promoters, have been widely applied by broiler industries. These feed additives are used by the poultry industries to improve health and productivity of chicken flocks. These feed additives are effectively used to support such high and very fast growth of broiler. In contrast to their positive impacts, these some feed additives may still remain in the broiler products as residues or there are at least some perceptions among the consumers that broiler meat may contain the residues which may give negative effects on consumer's health problems.

An increasing number of consumers demanding health and natural foods have favored organic livestock farming. Organic livestock farming, which is reputed to be environmentally friendly and sustains animals in good health, resulting in high quality products has a defined standard with a greater attention to animal welfare and at least 80 percent of feed grown without pesticides or artificial fertilizers. The higher guarantee of the absence of residue is certain, but the effect of organic farming on qualitative

characteristics of the products is unknown. This study sought to contribute to the knowledge of qualitative traits of broiler carcass and meat produced organically

The practice of complementary and alternative medicine is now on the increase in **developing countries** in response to World Health Organization directives culminating in several pre-clinical and clinical studies that have provided the scientific basis for the efficacy of many plants used in folk medicine to treat infections In pursuit of improved broilers health and in order to fulfill consumer expectation in relation to food quality, poultry producers commonly apply natural feeding supplements, mainly herbs.

Apart from the inadequate supply and consumption of animal protein, there has been a resurgence of interest in improving the physicochemical and sensory properties of meat, as well as its storage life. In pursuit of improved chicken healthiness and in order to fulfill consumer expectations in relation to food quality, poultry producers more and more commonly apply natural feeding supplements, mainly herb.

A poultry carcass should produce highly nutritious value, flavor, and texture and eating quality of meat as commodity, it has to meet the requirements of the costumer in terms of bright and attractive color, characteristics of meat and appearance of the product offered. Also, include the nutritive value, high satiety value, color and especially free from chemical residue. Keeping the bled animal suspended by its hind legs throughout the dressing operations greatly increased the efficiency of converting an animal into a carcass and by products.

This study was conducted to find out the effect of Aloe Vera extract on the carcass yield and quality of Broilers. The result of this study can serve as guide in using aloe vera extract as a supplement for Broilers.

Specifically, this study aimed to determine the effect of aloe aera extract on the carcass yield and quality of Broilers, and to determine the effect on slaughter weight, carcass weight, and dressing percentage on the different major and minor cuts of broilers.

These production phase of this study was conducted at BSU Poultry Experimental Station while carcass yield evaluation and organoleptic test were done at meat laboratory on February 24, 2012.

REVIEW OF LITERATURE

Aloe vera is a stemless or very short-stemmed succulent plant growing to 60–100 cm (24–39 in) tall, spreading by offsets. The leaves are thick and fleshy, green to grey-green, with some varieties showing white flecks on the upper and lower stem surfaces. The margin of the leaf is serrated and has small white teeth. The flowers are produced in summer on a spike up to 90 cm (35 in) tall, each flower pendulous, with a yellow tubular corolla 2–3 cm (0.8–1.2 in) long. Like other Aloe species, Aloe vera forms arbuscular mycorrhiza, a symbiosis that allows the plant better access to mineralnutrients in soil. Aloe vera, also known as the true aloe or medicinal aloe, is a species of succulent plant in the genus Aloe that is believed to have originated in the Sudan. Aloe vera grows in arid climates and is widely distributed in Africa, India, Nepal and other arid areas. The species is frequently cited as being used in herbal medicine. Many scientific studies on the use of extracts of Aloe vera have been undertaken, some of them conflicting. Despite these limitations, there is some preliminary evidence that Aloe vera extracts may be useful in the treatment of wound and burn healing, minor skin infections, sebaceous cysts, diabetes, and elevated blood lipids in humans. These positive effects are thought to be due to the presence of compounds such as polysaccharides, mannans, anthraquinones, and lectins (Wikipedia, 2012).

Broiler production alone already comprises 85% of the poultry meat requirement of the Filipinos. Although the demand is high, the industry could hardly make up with the requirement due to high prices of commercially and imported feeds. Thus, the poultry industry particularly on the part of the raisers, continuously find means to lessen their cost of production. One way is to look for alternative source of feed supplement that is not only

cheap and can boost the growth of chickens but most important, is organic and readily available. These dilemmas in the broiler industry were particularly addressed using extracts from aloe vera. Unknown to many, this plant is not only valued for its medicinal components but it also plays an important role in promoting growth in chickens. The 42-day experiment showed that the final weight and gain in weight of the broilers were significantly affected by the aloe vera extract supplementation. Broilers given with the aloe extracts as drink supplement (5-20 ml) significantly improved their growth rates compared to those broilers given plain water, which showed the lowest final weight and gain in weight. In terms of feed consumption, broilers given the 15 ml and 20 ml of aloe extracts in their drinks rated the highest (ave. of 3387.78 g and 3148.89 g, respectively) while those given the plain water rated the least (2737.22 g). This result, according to the researchers implied that the final weight and gain in weight were strongly influenced by the feed intake of the chicken. For the economic competency, analysis showed that chicken whose drink was supplemented with aloe extracts showed the best return of investment (ROI) among the treatments with 30% ROI compared to the 7.5% of the unsupplemented (Bejar and Colapo, 2005).

Aloe is also an excellent treatment for skin conditions such as burns and eczema. It is often reported that burns can be healed remarkably quickly and the pain reduced very quickly with topical application of Aloe Vera to the burn area. As well as applying topically, Aloe can also be taken internally so it is just as useful for internal epithelial tissue as it is for the skin. For example, mouth and stomach ulcers, nasal and sinuses, bowels, lungs and genital tracts. Aloe works on membranes and surfaces. Aloe also seems to be excellent at regulating the immune system (an immunomodulator). This means it can both

stimulate the immune response for those with weakened immune systems either from existing conditions or post-illness fatigue. It can also calm the immune response, such as for Hay fever where less immune reaction is beneficial. Although Aloe is about 99% water, the remaining 1% is extremely powerful and it is thought this is because the close to 100 ingredients work extremely well together (synergistically).

The ingredients in Aloe can be grouped into the following categories: Vitamins, Minerals, Sugars, Enzymes, Lignins, Amino Acids, Anthraquinones, Saponins, Fatty Acids, Salicylic Acid. Aloe vera is one of the only known natural vegetarian sources of Vitamin B12, and it contains many minerals vital to the growth process and healthy function of all the body's systems. Numerous studies worldwide indicate that it is a general tonic for the immune system, helping it to fight illness of all kinds. Various research studies are underway to explore the potential of the components to boost immunity and combat the HIV virus, and to treat certain types of cancer (particularly leukemia). It may even have a role to play in managing diabetes. Over 200 worldwide scientific research papers have been published on the effects. The three main categories of research include anti-inflammatory, anti-bacterial, and anti-viral actions of the plant.

The juice is said to soothe digestive tract irritations such as colitis, ulcers and irritable bowel syndrome. Aloe vera contains protein, calcium, magnesium, zinc, vitamins A, B12 and E, essential fatty acids and is naturally rich in: *Vitamin C* which helps maintain tone of blood vessels and promotes good circulation and is essential to the health of the adrenal gland which supports our body in times of stress. *Amino acids* which are chains of atoms constructing protein in our body. The juice is said to be one of the finest body cleansers, cleaning morbid matter from the stomach, liver, kidneys, spleen, bladder, and is

considered the finest, known colon cleanser. Studies have shown that it is healing and soothing in the relief of indigestion, stomach distress and ulcers. People claim relief from arthritis, bladder and kidney infections; leg cramps, constipation, hemorrhoids, insomnia, and for vaginitis, it is said to be an excellent vaginal douche. An excellent internal tonic for energy and well-being Aloe juice may add greatly to the strength of the food fed, digestive tract, skin, and overall good health and happiness. It is also used to ease heartburn, ulcers, diverticular disorders, and other types of digestive upset. It is used as an anti-inflammatory and may be taken internally as a remedy for certain digestive complaints. European folk medicine calls for using the juice to relieve heartburn and ulcers. Preliminary research has shown promising results.

Clinical trials in Japan indicate that certain compounds in the herb reduce the secretion of stomach juices and the formation of lesions. Animal studies and anecdotal reports claim that drinking the juice or taking it as a tablet or capsule can reduce swelling and inflammation in arthritic joints. Drinking the juice may also help those asthmatic patients who are not dependent on cortico-steroids. "We found no indication of harm done to the rats even at high levels." In fact, the Aloe-drinking animals actually lived 25 percent longer than those in the control group (Jeremiah Herlihy, 1997).

According to Adams (2007), in written thousands of articles on nutrition and disease prevention --aloe vera is the most impressive herb of them all. (Garlic would be a close second.) There is nothing on this planet that offers the amazing variety of healing benefits granted by aloe vera. In a single plant, aloe vera offers potent natural medicine that: (Chevallier, 1996)

a. Halts the growth of cancer tumors

b. Lowers high cholesterol

c. Repairs "sludge blood" and reverses "sticky blood”

d. Boosts the oxygenation of your blood

e. Eases inflammation and soothes arthritis

f. Protects the body from oxidative stress

g. Prevents kidney stones and protects the body from oxalates in coffee and tea

h. Alkalizes the body, helping to balance overly acidic dietary habits

i. Cures ulcers, IBS

j. Crohn's disease and other digestive disorders

k. Reduces high blood pressure natural

l. Nourishes the body with minerals vitamins, enzymes and glycol nutrients

m. Accelerates healing from physical burns and radiation burns

n. Replaces dozens of first aid products, makes bandages and antibacterial sprays

o. Halts colon cancer, heals the intestines and lubricates the digestive tract

p. Ends constipation, stabilizes blood sugar and reduces triglycerides in diabetics

q. Functions as nature's own "sports drink" for electrolyte balance

r. Boosts cardiovascular performance and physical endurance

s. Speeds recovery from injury or physical exertion.

The gel is useful for almost any skin condition that needs soothing and astringing, and will help varicose veins to some degree, the aloe gel has a dramatic ability to heal wounds, ulcer and burns, putting a protective coat on the affected area and speeding up the

rate of healing. The action is in part due to presence of aloectin B, which stimulates the immune system.

MATERIALS AND METHODS

Materials

The different materials used were: 16 heads of 45 day old broilers from a previous growth study on the effect of aloe vera extract on the growth performance of broilers, gas stove, the same size and type of steamer, knives, containers, weighing scale, digital camera, record book, ball pen and Ziploc bags.

The birds have more or less the same weight. Four birds were taken from each of the four treatments from the previous study. Each bird represented one replication, making a total of 4 replicates per treatment. The treatments administered to the birds are as follows:

T_0- water (control) without antibiotic

T_1- water with commercial antibiotic

T_2- 15 ml aloe vera extract per liter of clean water

T_3- 25 ml aloe vera extract per liter of clean water

Slaughtering of the Birds

Prior to dressing, the birds were confined in cages and fasted for 8 hours, but water was provided *ad libitum*. The live weight of birds was taken individually before dressing. At the time of slaughtering or dressing, the birds were secured by holding both shanks with one hand and both wings with the other hand and to prevent struggling. With the help of an assistant, bleeding was done by cutting the large blood vessel of the neck at the lateral side below the mandible. Complete bleeding was accomplished by raising the bird approximately 45^0 so that the caudal part will be higher than the head. After bleeding, each bird was immersed into hot water about 4 seconds or more after which its feather are

easy to pluck. After plucking, the birds were washed thoroughly and made ready for evisceration. Evisceration was done by laying the bird in dorsal recumbence. The esophagus and wind pipe was then pulled out the base of mandible. For easy insertion of the fingers, a slit was made around the vent then down to the keel. The two fingers were inserted into the slit in the abdominal cavity to the abdominal attachment on the entrails. After entrails were pulled out, the liver, heart, and gizzards with proventiculus were separated. The head was detached from the atlanto-occipital joint, which was accomplished by severing the skin, muscle and ligaments at the said joints with a sharp knife.

Carcass Yield Evaluation

Each dressed bird was placed on the pan of the weighing scale and weight was recorded in kilograms. The skin, carcass and abdominal color were observed. Abdominal fats of broiler belonging to the different treatments was compared.

Carcass Quality Evaluation

The breast part of broilers from the different treatments were steamed for 35 minutes in the same size and type of steamer (Figure 1). After steaming, the breast (Figure 2) was sliced in the same size. A panel of tasters was evaluated and marked their description in the evaluation sheets.

Data Gathered

The following parameters were gathered from the study:

1. Slaughter weight (kg). This was the weight of the broiler before slaughter time (Figure 3).

Figure 1. The steamer used by the researcher

2. Dressed weight (kg). This refers to the actual weight of slaughter bird after plucking the feathers, and removing the head, feet and entrails.

3. Dressing percentage (%). This was obtained by dividing the carcass weight by the slaughter weight multiplied by 100%.

4. Percentage of major cuts (%). This includes the weight of breast, wings, and legs.

5. Percentage of minor cuts (%). This includes the weight of head, feet and neck.

6. Length of GIT (inch). This refer to the lenght of gastro intestinal tract.

7. Weight of gizzard (g). This was the weight of full gizzard.

8. Meat appearance, tenderness, juiciness flavor, aroma and acceptability. This was obtained through organoleptic testing of a panel of testers composed of 20 individuals who was randomly invited (Figure 4).

Data Analysis

Data gathered were analyzed using the analysis of variance for Completely Randomized Design and treatment means were compared using Duncans Multiple Range Test (DMRT).

Figure 2. The meat samples being steamed

Figure 3. Slaugther weights being taken

Figure 4. The taste panel during the sensory evaluation

RESULTS AND DISCUSSION

Slaughter Weight, Dressed Weight and Dressing Percentage

Table 1 presents the slaughter weights of the birds after 8 hours of fasting. The birds given water with commercial antibiotic, 15 ml aloe vera extract per liter of clean water and 25 ml aloe vera extract per liter of clean water were homogenous in terms of slaughter weight and dressed weight. This was expected because the birds for slaughter were purposely selected to have more or less similar weights.

The dressing percentage however varied. The birds given 15 ml and 25 ml aloe vera had higher dressing percentage recovery compared to the control group. This shows that using aloe vera extract supplement in water did affect the dressing percentage of the birds. It was observed that the dressing of the selected samples fall below the industry standard of 68-70% dressing recovery of broiler.

Table 1. Slaughter, dressed weights and dressing percentage of the birds

TREATMENT	SLAUGHTER WEIGHT(kg)	DRESSED WEIGHT(kg)	DRESSING PERCENTAGE
Water (control) without antibiotic	1.83[a]	1.17[a]	63.75[c]
Water with commercial antibiotic	1.89[a]	1.24[a]	64.75[bc]
15 ml aloe vera extract per liter of clean water	1.88[a]	1.27[a]	67.50[a]
25 ml aloe vera extract per liter of clean water	1.88[a]	1.27[a]	67.25[ab]

Means with the same letter superscript are not significantly different

Major Cuts.

Table 2 shows the weight of major cuts expressed as percentage of slaughter weight. The weight of back, breast, wings and legs did not vary across treatments. The weight of back ranged from 12.50 to 13.46% which is less than industry standards. Meanwhile, the breast yield of the broilers was observed to be from 24.40 to 27.20%. the wings shared about 7% of the slaughter weight which did not vary considerably between treatments. The leg portion was at 18.72 to 20.55%.

The weight of legs exhibited in Table 2 includes the weight of thigh as well. The weight of thigh of broiler supplemented with aloe vera extract is numerically higher. Nevertheless, statitical analysis revealed no significant differences among treatment means which implies that the birds yielded the same amount of meat particularly in the legs without regard to treatments.

Table 2. Percentage of back, breast, wings, legs of the birds

TREATMENT	BACK (%)	BREAST (%)	WINGS (%)	LEGS (%)
Water (control) without antibiotic	13.46[a]	24.40[a]	7.60[a]	18.72[a]
Water with commercial antibiotic	12.50[a]	25.40[a]	7.61[a]	19.6 [a]
15 ml aloe vera extract per liter of clean water	12.83[a]	27.20[a]	7.51 [a]	20.21[a]
25 ml aloe vera extract per liter of clean water	12.63[a]	26.53[a]	7.98[a]	20.55[a]

Means with the same letter superscript are not significantly different

Minor Cuts

Statistical analysis showed in Table 3 that there were no significant differences among all treatments which indicate that all treatment had more or less the same feet yield.

The weight of heads also did not vary across the levels of aloe vera extract in the water of the broilers. There was likewise no significant differences found among the weights of neck which means that the neck yields of the broilers supplemented with pure water, pure water with commercial antibiotic and aloe vera extract were more or less alike.

Length of GIT and Weight of Gizzard

Table 4 presents the length of gastro intestinal tract and weight of gizzard statistical analysis result shows that no significant from all the treatments. It is an indication that aloe vera extract in the drinking water of the birds did not affect the length gastro intestinal tract and weight of gizzard GIT from different treatments.

Table 3. Percentage of feet, neck, head of the sample birds

TREATMENT	FEET (%)	NECK (%)	HEAD (%)
Water (control) without antibiotic	4.58[a]	3.28[a]	2.66[a]
Water with commercial antibiotic	4.43[a]	3.44[a]	2.45[a]
15 ml aloe vera extract per liter of clean water	4.19[a]	3.83[a]	2.40[a]
25 ml aloe vera extract per liter of clean water	4.39[a]	3.60[a]	2.60[a]

Means with the same letter superscript are not significantly different

Table 4. Length of full GIT and weights of empty gizzard of the sample

TREATMENT	FULLGIT (inch)	GIZZARD (g)
Water (control) without antibiotic	84.25[a]	27.50[a]
Water with commercial antibiotic	85.63[a]	35.00[a]
15 ml aloe vera extract per liter of clean water	80.00[a]	27.50[a]
25 ml aloe vera extract per liter of clean water	87.50[a]	28.75[a]

Means with the same letter superscript are not significantly different

Sensory Traits of the Carcass

Appearance. Table 5 shows that the appearance of cooked meat samples from the birds supplemented with commercial antibiotic were desirable in appearance while the meat samples from the birds given with water without antibiotic and water with different levels of aloe vera extract was moderately desirable. It can be assumed that the appearance of cooked carcass produced by broilers is not affected by the aloe vera extract in the drinking water.

Aroma. Table 6 shows that 15 ml aloe vera extract did not produce any effect on the aroma of meat produced by the birds based on the result of the meat evaluation through organoleptic test. The meat from the control group and the group given with commercial antibiotic 15 ml aloe vera extract all got a verbal rating of like moderately. It is interesting to note that the panel liked the cooked meat from the birds given 25 ml aloe vera in their drinking water very much.

Flavor. The differences in flavor of the meat samples were not different among the treatments as shown in Table 7.

All meat samples got a verbal rating of good. These results reveal that the addition of aloe vera at the levels of 15 ml to 25 ml to the drinking water of the birds did not affect the flavor of the meat.

Tenderness. Table 8 focuses on the tenderness of the meat samples which ranged from 1.50 to 2.49 for the numerical rating and moderately tender for the verbal rating.

This reveals that the tenderness of the meat samples derived from the birds was not affected by the treatments.

Table 5. Appearance of the cooked meat samples

TREATMENT	VERBAL DESCRIPTION
Water (control) without antibiotic	moderately desirable
Water with commercial antibiotic	desirable
15 ml aloe vera extract per liter of clean water	moderately desirable
25 ml aloe vera extract per liter of clean water	moderately desirable

Means with the same letter superscript are not significantly different

Table 6. Aroma of the cooked meat samples

TREATMENT	VERBAL DESCRIPTION
Water (control) without antibiotic	like moderately
Water with commercial antibiotic	like moderately
15 ml aloe vera extract per liter of clean water	like moderately
25 ml aloe vera extract per liter of clean water	like very much

Means with the same letter superscript are not significantly different

Table 7. Flavor of cooked meat samples

TREATMENT	VERBAL DESCRIPTION
Water (control) without antibiotic	good
Water with commercial antibiotic	good
15 ml aloe vera extract per liter of clean water	good
25 ml aloe vera extract per liter of clean water	good

Means with the same letter superscript are not significantly different

Table 8. Tenderness of cooked meat samples

TREATMENT	VERBAL DESCRIPTION
Water (control) without antibiotic	moderately tender
Water with commercial antibiotic	moderately tender
15 ml aloe vera extract per liter of clean water	moderately tender
25 ml aloe vera extract per liter of clean water	moderately tender

Means with the same letter superscript are not significantly different

Juiciness. For juiciness of the meat samples, there were no significant differences among the treatments as shown by the statistical analysis in Table 9.

The different treatments obtained a verbal rating of moderately juicy. This reveals that the juiciness of the meat samples derived from the birds in the different treatments was more or less the same. It also reveals that the inclusion of aloe vera extract did not affect on the juiciness of the meat samples produced by birds.

Acceptability. Based on the result of organoleptic test, the panel of tasters liked

very much the meat samples from the birds supplemented with aloe vera extract (table10). This implies that aloe vera can be incorporated in the drinking water of the birds without affecting the acceptability of the resulting meat product.

Table 9. Juiciness of product of the sample

TREATMENT	VERBAL DESCRIPTION
Water (control) without antibiotic	moderately juicy
Water with commercial antibiotic	moderately juicy
15 ml aloe vera extract per liter of clean water	moderately juicy
25 ml aloe vera extract per liter of clean water	moderately juicy

Means with the same letter superscript are not significantly different

Table 10. Acceptability of product of the sample

TREATMENT	VERBAL DESCRIPTION
Water (control) without antibiotic	like moderately
Water with commercial antibiotic	like moderately
15 ml aloe vera extract per liter of clean water	like very much
25 ml aloe vera extract per liter of clean water	like very much

Means with the same letter superscript are not significantly different

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

This study was conducted to determine the effect of aloe vera extract on the carcass yield and quality of broilers. The birds used on the study were 16 heads 45-day old broilers which were raised using 15 ml and 25 ml aloe vera extract as antibiotic replacement in the drinking water.

Specifically, the study aimed to determine the effect of the aloe vera extract on the carcass yield and quality of broilers through organoleptic test under La Trinidad condition, and to determine the effect on slaughter weight, carcass weight and dressing percentage in the major and minor cuts of broilers:

The treatments were as follows:

Water (control) without antibiotic; water with commercial antibiotic; 15 ml aloe vera extract per liter of clean water; 25 ml aloe vera extract per liter of clean water.

The result of statistical analysis showed no significance differences in terms of the different meat cuts as well as organoleptic test of the different treatments. Significant differences were noted in terms of the dressing percentage, while the carcass weight and the slaughter weight were not significant.

Conclusion

It is therefore concluded that aloe vera supplementation did not significantly affected the carcass yield and sensory characteristics of the broiler meat. Additionally, the major and minor cuts as well as some internal organs and the carcass weight produced by broilers were not affected by the aloe vera extract.

Recommendation

Based on the study, aloe vera extract may be good in terms of nutrient content. It is therefore recommended to conduct a further study using aloe vera extract with higher concentration to find out the efficacy or effect on the meat quality of broilers.

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