

BIBLIOGRAPHY

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ABSTRACT

The study was conducted to know the effect of aloe vera extract on the growth performance of broilers. Specifically, the study aimed to determine the level of aloe vera extract that will give the best result in terms of gain in weight, feed and water consumption, feed conversion ratio and mortality rate of broilers and to determine the profitability of raising broilers given aloe vera extract.

Following the completely randomized design, the 160 day old cob broilers were divided into four treatments. Each treatment has four replications with ten birds per replication making a total of forty birds per treatment. The four treatments were T0 (plain water without antibiotic), T1 (water with commercial antibiotic), T2 (15 ml aloe vera extract per liter of clean water) and T3 (25 ml aloe vera extract per liter of clean water).

Results of the study revealed that there were no significant differences among the treatments in terms of initial weight, final weight, gain in weight and water consumption of the birds. However, significant differences were observed on the feed consumption, feed conversion ratio and mortality of the birds. The significant difference observed is due to the number of birds died during the study.

Based on the results of the study, it is therefore not recommended to use aloe vera extract as water supplement for broilers. However, it is still recommended that further study should be made perhaps with higher level of aloe vera.



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INTRODUCTION

Poultry farming is one of the fastest growing segments in animal industry. In recent years, study showed that poultry industry increase throughout the world and increasing as years passed. Poultry farming has become one of the rapid contributors to the nutrient sufficiency of the economy. Poultry meats become a good source of animal protein needed by the human body. It is also generally accepted in most cultures as wholesome meat for human consumption. For this reason, consumption of poultry is increasing throughout the world.

However, consumption of poultry is much higher than the production. Poultry raisers cannot provide the adequate supply of poultry meat for the daily human consumption. One reason on low of supply of poultry is due to high amount of capital needed in the operation.

Though poultry products are of high demand, it is undeniable that poultry farming has a high cost of production due to high prices of commercially and imported feeds. It is in need therefore to explore alternative source of feed which is readily available, inexpensive, and especially organic to lessen the cost of production. It aims not only to lessen the cost of production but also to improve or enhance the growth of the chicks. Among the many products which could be use to improve the growth performance of the chicks is the aloe vera (*Aloe barbadensis*).

Aloe vera is a succulent plant member of the lily family. The leaves are thick and fleshy which contains the aloe vera gel. It is a short stemmed plant growing 60 cm to 100 cm. Aloe vera plants has been popular because of its medical properties. It was been used for the treatment of skin wound, burn, scalds also as anti-inflammatory and others in



many centuries.

Bejar and Colapo (2005) in their 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 aloe extracts as drink supplement (5-20 ml) had significantly improved growth rates compared to those broilers given plain water, as shown in the final weight and gain in weight. In terms of feed consumption, broilers given the 15ml and 20ml of aloe vera extracts in their drinks rated the highest while those given the plain water rated the least. 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. Meanwhile, no significant results were found in the conversion ratio (FCR) of broilers although numerically, those chicken given the aloe vera extracts showed slightly better FCR than those given plain water. Likewise, aloe vera supplementation did not significantly affect the carcass and sensory characteristics of the broiler meat, retaining the acceptability and saleability of the product. For the dressing percentage, again, those given the aloe extract supplementation command the highest dressing percentage while the unsupplemented ranked the least. This means that the heavier the final weight, the better is the dressing percentage in chickens. 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.

This research was conducted to confirm such effects of aloe vera on the growth performance of broilers. The result of this study can serve as a guide in using aloe vera as a supplement in broiler raising. This research also can provide data on how to enhance

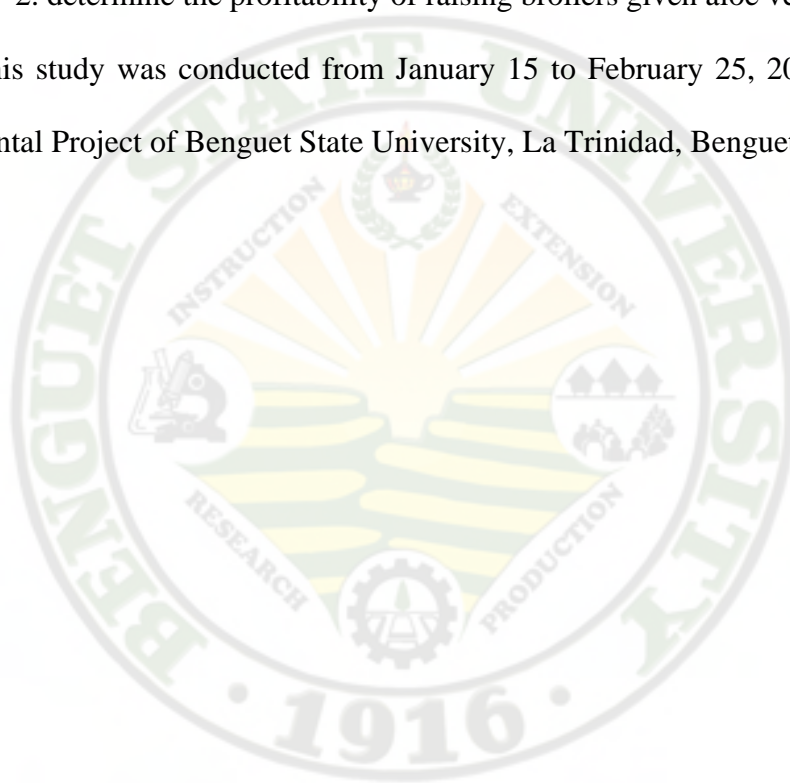


the performance of broilers to achieve high net profit and income through the use of aloe vera.

Specifically, this study aimed to:

1. determine the level of aloe vera extract that will give the best result in terms of gain in weight, feed and water consumption, feed conversion ratio and morbidity rate of broilers; and
2. determine the profitability of raising broilers given aloe vera extract.

This study was conducted from January 15 to February 25, 2012 at the Poultry Experimental Project of Benguet State University, La Trinidad, Benguet.



REVIEW OF LITERATURE

Aloe Vera

Aloe vera, native to the Africa continent, is also known as “lily of the desert”, the “plant of immortality”, and the “medicine plant”. The name was originated from the Arabic word *alloe*, meaning “bitter”, because of the bitter liquid found in the leaves (Herbal Information Center, 2011). It is a stem less 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 arbuscularmycorrhiza, a symbiosis that allows the plant better access to mineral nutrients in soil (Wikipedia, 2011).

Calvin (2008) stated that aloe vera has a long been a popular houseplant. Often called the 'miracle plant' or the 'natural healer', aloe vera is a plant of many surprises. It flourishes in warm and dry climates, and to many people it looks like a cactus with fleshy thorny leaves. In fact it is a member of lily family, staying moist where other plants wither and die by closing its pores to prevent moisture loss.

Aloe vera is commonly cultivated as a pot plant and has two distinct types of medicinal use. The clear gel contained in the leaf is remarkably effective healer of wounds and burns, speeding up the rate of healing and reducing the risk of infection. The yellow sap from the base of the leaf when dried is known as “bitter aloes”. It is a strong laxative, useful for short-term constipation (Chevallier, 1996). It is one of the few plants



that have stood the test of time. It has been in use for thousand years maintaining and regaining health. This storehouse, full of powerful nutrients, has proven to be true to the many claims that history has made on its behalf (Chupp, 2011).

Herbal Information Center (2011) stated that aloe vera is about 95% water. The rest contains active ingredients including essential oil, amino acids, minerals, vitamins, enzymes and glycoproteins. Herbalists have used it since the 1930's as a staple treatment. Many liquid solutions are made, some adding the juice with other plants and herbs. The juice is comforting to digestive tract irritations such as colitis and peptic ulcers.

Claims of Medical Properties

Dill (2010) said that aloe vera has been described as a portable first aid kit that you can use to treat cuts, burns, bruises, scrapes, sunburn, bites and stings. When aloe vera gel is applied topically onto or into the wound, it serves as a natural band aid or wound dressing that seals it against outside infections accelerating the body's own healing process. It is an effective, inexpensive first aid solution for all minor burns and scalds. Gardens Ablaze (2010) added that aloe has been well known for centuries for its healing properties, and both oral intake and topical dressings have been documented to facilitate healing of any kind of skin wound, burn, or scald-even speeding recovery time after surgery.

Adams (2007) stated that aloe vera gel is extremely effective in wound care. Large chunks of aloe vera gel can literally be packed inside wounds such as gunshot wounds or tissue tears (Herbal Information Center, 2011) and it can help in keeping the skin flexible, and has been used in the control of acne and eczema. It can relieve itching from insect bites and allergies. The healing power is due to increasing the availability of



oxygen to the skin, and by increasing the strength of skin tissue.

Aloe vera has been especially helpful of patients with severe and various skin diseases. It acts as moisturizer and hydrates the skin. After being absorbed into the skin, it stimulates the fibroblasts cells and causes them to regenerate themselves faster. It's the cells that produce the collagen and elastin so the skin will get smoother and look younger (Calvin, 2008). The clear gel of aloe vera has a dramatic ability to heal wounds, ulcers 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 (Chevallier, 1996).

According to the Herbal Information Center (2011), aloe vera contains three anti-inflammatory fatty acids that are helpful to the stomach, small intestine and colon. It naturally alkalizes digestive juices to prevent over acidity-a common cause of indigestion. It also helps clean the digestive tract by exerting a soothing, balancing effect (Calvin, 2008) and it works gently within the intestinal tract to help breakdown food residues that have become impacted. When the bowel is cleaned out, it greatly reduces bloating, discomfort, and helps ease stress, which only leads to more attacks of irritable bowel syndrome. Adams (2007) added that aloe vera is the best internal medicine for the treatment of colon polyps. It soothes the intestinal tracts and helps heal pre-cancerous lesions or growths.

Internally, aloe is showing real promise in the fight against AIDS, and the virus has become undetectable in some patients who used it on a regular basis, due to its immune system stimulant properties. It also seems to help prevent opportunistic infections in cases of HIV and AIDS. It appears to be of help in cancer patients



(including lung cancer) by activating the white blood cells and promoting growth of non-cancerous cells (Gardens Ablaze, 2010). It turns out that special polymers found in aloe vera gel have the ability to potentiate the oxygen carrying capacity of blood. What it means is that the aloe vera made the remaining blood work better. Aloe vera gel turns normal blood into super-oxygenated blood (Adams, 2007).

Natural Herbs Guide (2010) stated that aloe contains a component that acts against viruses such as flu, chickenpox, and herpes and can also kill bacteria. Adams (2007) said that aloe vera gel helps boost immune system function while destroying cancer tumors.

Using aloe vera topically is well known to ease inflammation of joints, reducing arthritis pain. But aloe can be also used internally, reducing inflammation throughout the body from the inside out. People who drink aloe vera for two weeks typically begin to experience a significant reduction of inflammation symp (Adams, 2007). Prednosolone and Indomethacin (common anti-inflammatory drugs) were utilized in a comparative study with the aloe vera gel to observe the effects on the tissue culture cells. The gel was found to be just as effective as Prednosolone and Indomethacin, without having the long term toxicity of either drug (Wolfe, 2011).

Gardens Ablaze (2010) said, taken orally, aloe also appears to work on heartburn, arthritis and rheumatism pain and asthma, and studies shown that it has an effect on lowering blood sugar levels in diabetics. Other situations in which it appears to work when taken internally include congestion, intestinal worms, indigestion, stomach ulcers, colitis, hemorrhoids, liver problems such us cirrhosis and hepatitis, kidney infections, urinary tract infections, prostate problems, and as a general detoxifier. Herbal



Information Center (2011) stated that a newly discovered compound in the plant called acemannan, is being studied for its ability to help the bodies natural resistance. Studies have shown that acemannan helps improve the number of T-lymphocyte cells that assist the immune system.

Virucidal Studies

The Aloe Vera gel formula was found to be virucidal against Herpes simplex and Herpes zoster viruses (Wolfe, 2011).

Commodity Uses

Aloe vera is now widely used on facial tissues, where it is promoted as a moisturizer and or anti-irritant to reduce chafing of the nose of users suffering hay-fever or cold. It has also been suggested that biofuels can be obtained from aloe vera seeds. It can also be used to retwist dreadlocked hair, a favorite agent for vegans and those preferring natural products. Aloe vera is also used for soothing the skin, and keeping the skin moist to help avoid flaky scalp and skin in harsh and dry weather. Aloe vera may also be used as a moisturizer for oily skin (Wikipedia, 2011). The gel is useful for almost any skin condition that needs soothing and astringing, and will help varicose veins to some degree (Chevallier, 1996). Commercially, aloe can be found in pills, sprays, ointments, lotions, liquids, drinks, jellies, and creams (Gardens Ablaze, 2010).

Biologically Active Compounds

Aloe vera (inner gel) contains the 8 essential Amino Acids that the human body needs but cannot manufacture (Calvin, 2008). It is rich in nourishing phytonutrients that play a key role in the healing process. These include vitamins, especially the antioxidant



vitamins A, B complex, C, and E, minerals including calcium, magnesium and zinc as well as amino acids like tyrosine and phenylalanine. Other beneficial compounds include: prostaglandins, polysaccharides, saponins, enzymes, glycoproteins, anthraquinones, plant sterols and lignin (Dill, 2010).

According to Chupp (2011), Aloe Vera contains 18 of the 22 amino acids and 7 of essential one in its purest form. This is another elongated reason that makes aloe vera such an important nutritional element.



MATERIALS AND METHODS

The materials used in the study were 160 day-old Cobb broiler chicks, commercial feeds, antibiotics, brooding-rearing cages, weighing scale, old newspapers, feeding and drinking troughs, record book, ball pen, disinfectants, incandescent bulbs, blender, measuring cup, measuring bottles and aloe vera plants.

Methodology

Pre-experimental phase. A week before the arrival of the chicks, all equipment was cleaned and disinfected. The floor of the brooders were covered with old newspapers to help in conserving heat during brooding period and serve as a feed receptacle during the first days of brooding. The 100-watt bulbs were installed and lighted 5 hours before the arrival of the chicks for the reason of providing heat and light to the chicks.

Experimental design and treatments. Following the completely randomized design (CRD), upon arrival the 160 day old broiler chicks were divided into four treatments. Each treatment has four replications with 10 birds per replication making a total of 40 birds per treatment. However, initial weights of the chicks were recorded before they were placed in their assigned cages. Brooding was done upon arrival of the chicks up to 21 days and they were placed on their assigned cages after the brooding.

The four treatments were:

T₀= water (control) without antibiotic

T₁= water with commercial antibiotic

T₂=15 ml aloe vera extract per liter of clean water

T₃=25 ml aloe vera extract per liter of clean water



Procurement of the stocks. The experimental birds were obtained from a reliable supplier. Cobb broilers were used in the study.

Preparation of aloe vera extract. Fresh aloe vera plants were gathered from Buguias, Benguet. The aloe vera leaves were broken off and split open to collect the gel inside the leaf for the making of aloe vera extract. The aloe vera gel was extracted using blender to make the gel liquid. The aloe vera extract were added to the water on the specified amount per treatment.

Care and management. All the experimental birds were subjected to the same feeding management except the water that was provided. They were given same feeds for each treatment. In T₀, water without commercial antibiotics was offered to the birds. Water with commercial antibiotics was offered to the birds in T₁ while in T₂, 15 ml of aloe vera extract was added per liter of clean water. The birds in T₃ were offered water with 25 ml of aloe vera extract per liter. The different treatments were administered from the first day of brooding until the end of the study for a total of 42 days.

Starter crumble was given to the birds for the first two weeks of age. This was shifted to grower crumble for the next two weeks (15th – 30th days) of the birds and then finisher pellet was offered to the birds until the end of the study (31st- 42nd days old). Feed and water offered to the birds were recorded before they were given to determine the food and water consumption of the birds. Any feed left over and water left over were measured and recorded early in the morning before they were given feed and water for their daily consumption. Waterers were washed from clean water before filling again. Same through with the feeding troughs, they were cleaned before putting feeds for the birds.



The brooding and rearing cages were cleaned daily to ensure good health of the birds. Old newspapers used in the brooding days were changed every 1day to 2 days to insure cleanliness.

Data Gathered

The data gathered are the following:

1. Initial weight (kg). This is the weight of the birds at day old.
2. Final weight (kg). This refers to the weight of the birds at 42 days old.
3. Feed consumption of the birds (kg). This is the amount of feeds that the birds consumed throughout the study.
4. Water consumption of the birds (l). This is the amount of water that the birds consumed throughout the study.
5. Morbidity. This is the number of birds that got sick throughout the duration of the study.
6. Mortality. This is the number of birds that died throughout the study.
7. Feed left-over. This was obtained by taking the measurement of the feed left-over of the birds.
8. Water left-over. This was obtained by taking the measurement of the water left-over of the birds.
9. Cost of feed (Php). This is the cost of feed that the birds consumed throughout the study.
10. Production cost (Php). This includes the cost of feeds, medication, and other expenses that was incurred in the study.

From the data above, the following were computed:



1. Total gain in weight of the birds (kg). This was obtained by subtracting the initial weight from final weight of the birds.
2. Feed conversion ratio. This was computed by dividing the feed intake by the gain in weight of the birds.
3. Feed consumption (kg). This was obtained by subtracting the total feed leftover from the total feed offered to the birds.
4. Water consumption (l). This was obtained by subtracting the total water left over from the total water offered to the birds.
5. Mortality rate (%). This was computed by dividing the number of birds died by their initial number divided by 100.
6. Feed cost to produce a kilogram gain in weight (Php). This was obtained by multiplying the feed cost per kilogram by the feed conversion ratio.
7. Total cost per kilogram of broiler produced (Php). This was computed by dividing the total cost of production by the total kilogram of the birds per treatment.
8. Net profit (Php). This was obtained by subtracting the total cost of production from the total sales.
9. Return of investment (ROI). This was obtained by dividing the net profit by the cost of production multiplied by 100.

Data Analysis

All the data gathered were tabulated and analyzed using the analysis for Completely Randomized Design (CRD). The significance between means was compared using the Duncan's Multiple Range Test (DMRT).



RESULTS AND DISCUSSION

Initial Weight

In Table 1 it presents the initial weight of the experimental birds in the different treatments. The average initial weights of the birds were taken when the experimental birds are at day old. Statistical analysis showed that there were no significant differences among the initial weight of birds in different treatments. The body weights of birds were more or less identical and numerical differences were too small to cause significant variation. The result implies that initial weights of birds are of the same sizes at the start of the study.

Final Weight

The final weights of the experimental birds in different treatments are presented in Table 2. Final weights were taken during the 42nd day of the birds at the end of the experimental period. The final weight presented in the table showed that birds offered water with 25 ml aloe veraextract together with the water mixed without commercialantibiotic have the same value of final weight. In the same manner, the birds given 15 ml

Table 1. Average initial weight of the birds

TREATMENT	MEAN INITIAL WEIGHT (kg)
Water (control) without intibiotic	0.047875 ^a
Water with commercial intibiotic	0.047375 ^a
15 ml aloe vera extract per liter of water	0.047225 ^a
25 ml aloe vera extract per liter of water	0.049725 ^a



Means with the same superscript are not significantly different at $P < 0.05$ DMRT aloe vera extract and those which drank water with antibiotic premix had similar final weight values. Nonetheless, all final weights were found to be homologous. This suggest that aloe vera extract supplementation did not affect the final weight of the broilers contradictory to the recent study of Bejar and Colapo (2005) which showed that final weight and gain in weight of the birds were significantly affected by the aloe vera extract supplementation.

Gain in Weight

Table 3 shows the average gain in weight of the experimental birds in different treatments. Following the trend in final weight, there were no significant differences in the gain in weight of the birds on the different treatments. This implies that aloe vera extract did not affect the growth rate of the birds. As presented in the table, it means that the experimental birds given aloe vera extract and commercial antibiotic had the same ability to gain weight together those offered water (control) without antibiotic.

Table 2. Average final weight of the birds

TREATMENT	MEAN FINAL WEIGHT (kg)
Water (control) without antibiotic	1.86225 ^a
Water with commercial antibiotic	1.79875 ^a
15 ml aloe vera extract per liter of water	1.79875 ^a
25 ml aloe vera extract per liter of water	1.86200 ^a

Means with the same superscript are not significantly different at $P < 0.05$ DMRT



Feed Consumption

The average feed consumption of the birds in different treatments is presented in Table 4. Birds treated with 15 ml aloe vera extract have the highest feed consumption as revealed by statistical analysis. The birds treated with 25 ml aloe vera have the second highest feed consumption but not as far from either treatment with or without commercial antibiotic. This means that birds treated with 15 ml aloe vera extract consume high amount of feeds than the other birds on the other treatments which causes the significant difference on the treatments.

Table 3. Average gain in weight of the birds

TREATMENT	MEAN GAIN IN WEIGHT (kg)
Water (control) without antibiotic	1.8145 ^a
Water with commercial antibiotic	1.7515 ^a
15 ml aloe vera extract per liter of water	1.7518 ^a
25 ml aloe vera extract per liter of water	1.8150 ^a

Means with the same superscript are not significantly different at $P < 0.05$ DMRT

Table 4. Average feed consumption of the birds

TREATMENT	MEAN FEED CONSUMPTION (kg)
Water (control) without antibiotic	4.1743 ^b
Water with commercial antibiotic	4.2228 ^b
15 ml aloe vera extract per liter of water	4.6775 ^a
25 ml aloe vera extract per liter of water	4.4858 ^{ab}



Means with the same superscript are not significantly different at $P < 0.05$ DMRT
Feed Conversion Ratio (FCR)

Feed conversion ratio of the birds in different treatments is shown in Table 5. Statistical analysis revealed that there were significant differences among the different treatments. Birds given water incorporated with 15 ml aloe vera extract are significantly less efficient in terms of feed conversion ratio of the birds from the other treatments. One cause of the significant difference is due to high feed consumption of the birds but lesser gain in weight. Meanwhile the treatments of water (control) without antibiotic, water with commercial antibiotic and 25 ml aloe vera extract per liter of water have the same feed conversion ratio. Although there are slight differences on their feed conversion ratio, it is very minimal.

Water Consumption

Table 6 presents the water consumption of the experimental birds in different treatments. Statistical analysis shows that water consumption of the experimental birds in the different treatments have no significant difference. This means that the birds have

Table 5. Average feed conversion ratio of the birds (FCR)

TREATMENT	FCR
Water (control) without antibiotic	2.3020 ^b
Water with commercial antibiotic	2.4125 ^b
15 ml aloe vera extract per liter of water	2.7075 ^a
25 ml aloe vera extract per liter of water	2.4718 ^b

Means with the same superscript are not significantly different at $P < 0.05$ DMRT



Table 6. Average water consumption of the birds

TREATMENT	MEAN WATER CONSUMPTION (l)
Water (control) without antibiotic	97.6880 ^a
Water with commercial antibiotic	97.6913 ^a
15 ml aloe vera extract per liter of water	97.6025 ^a
25 ml aloe vera extract per liter of water	97.5800 ^a

Means with the same superscript are not significantly different at $P < 0.05$ DMRT

more or less the same water consumption. It may also mean that the addition of aloe vera extract in the water was well tolerated by the birds since no critical observations were noted.

Mortality

Out of the 160 birds, there were 20 birds that died during the study. Necropsy findings revealed wet vent, beak with mucous discharge, apparently enlarged lymph nodes, ischemic visceral pleura with mucous discharge, ischemic pericardium and epicardium, enlarged edematous heart, which are suggestive of Chronic Respiratory Disease (CRD). Three birds died from the water (control) without antibiotic treatment and four birds died from the treatment of water with commercial antibiotic. Seven birds have died in treatment of water with 15 ml aloe vera extract and 6 birds died from the treatment of water with 25 ml aloe vera extract. Significant differences among the treatments were shown by the statistical analysis. Birds treated with 15 ml aloe vera extract have the highest mortality rate while birds treated with water (control) without



antibiotic have the lowest mortality rate. This shows that aloe vera supplementation did not stimulate the immune system of the birds as cited by Chevallier (1996) and Garden.

Ablaze (2010) but this does not mean that aloe vera has some contents that cause the death of the birds as revealed by the necropsy findings.

Net Returns

Table 8 presents the net returns of investment on the study. Those birds given with water (control) without antibiotic had the highest return of investment (ROI) followed by those birds given water with commercial antibiotic and those birds given water incorporated with 25 ml aloe vera extract and lastly those birds given water incorporated with 15 ml aloe vera extract.

Table 7. Mortality rate(%)

TREATMENT	MORTALITY RATE (%)
Water (control) without antibiotic	7.500 ^c
Water with commercial antibiotic	10.000 ^{bc}
15 ml aloe vera extract per liter of water	17.500 ^a
25 ml aloe vera extract per liter of water	15.000 ^{ab}

Means with the same superscript are not significantly different at P<0.05 DMRT

Table 8. Return of investment and net returns

TREATMENT	GROSS TOTAL COST OF NET	ROI
RETURN PRODUCTION INCOME (%)		
Water (control) without antibiotic	8,258.00 7,140.00 1,118.00	15.66
Water with commercial antibiotic	7,772.00 7,479.00 293.00	3.92



15 ml aloe veraextract per liter of water	7,174.00	7,172.00	2.00	0.03
25 ml aloe vera extract per liter of water	7,597.00	7,345.00	252.00	3.43

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

The results of the study on the effect of aloe vera extract on the growth performance of broilers shows that there were no significant differences among the different treatments on the following parameters gathered during the experiment; the initial weight, final weight, gain in weight and water consumption of the experimental birds. The results implies that supplementation of aloe vera has no effect on the growth performance of broilers.

Meanwhile, significant differences among the different treatments were revealed in the feed consumption, feed conversion ratio, and mortality of the birds. It is due to the number of mortality of birds in the different treatments that cause significant differences among the treatments. The cause of mortality is caused by Chronic Respiratory Disease (CRD) revealed by necropsy findings.

In terms of their returns of investments (ROI), birds given with water (control) without antibiotic had the highest return of investments which has an ROI of 18.95 followed by those birds treated with 25 ml aloe vera per liter of water and those birds given with water incorporated with commercial antibiotic which has an ROI of 5.66 and 5.24 respectively. Those birds given with water incorporated with 15 ml aloe vera per liter of water had the lowest return of investment which has an ROI of 1.97.

Conclusion

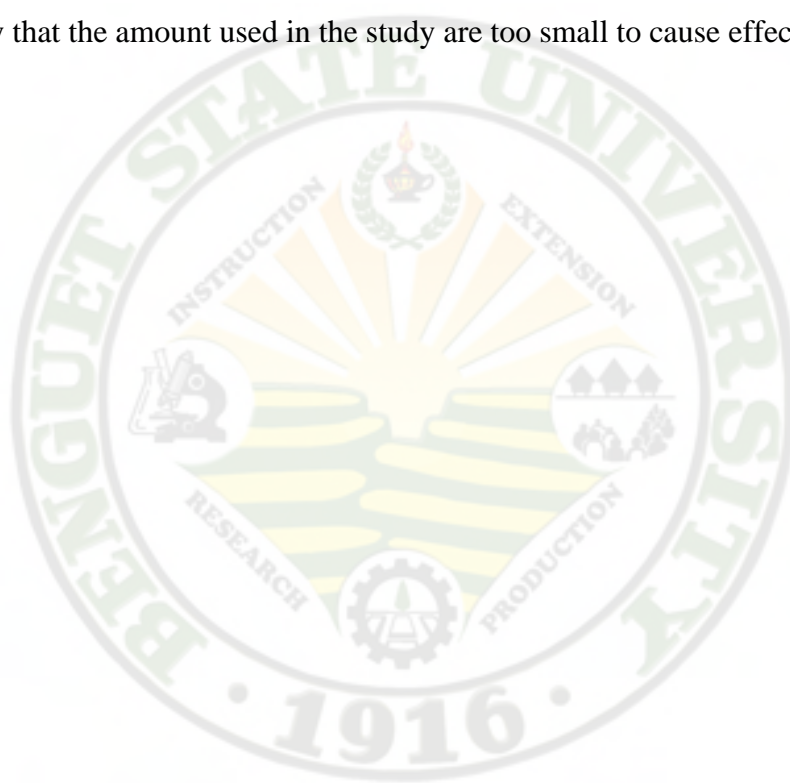
As shown from the results and observations on the experiment, it is therefore



concluded that using aloe vera extract as water supplement for broilers did not show any effect on the growth performance of broilers in this study.

Recommendation

Based on the results of the study it is not therefore recommended to use aloe vera extract as water supplement for broilers. However, it is still recommended that further study should be made using aloe vera extract in higher amount because there is possibility that the amount used in the study are too small to cause effect on the birds.



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APPENDICES

Appendix Table 1. Average initial weight of the birds (kg)

TREATMENT	REPLICATIONS				TOTAL MEAN	
	I	II	III	IV		
Water (control) without antibiotic	0.050	0.048	0.047	0.047	0.192	0.048
Water with commercial antibiotic	0.047	0.048	0.046	0.048	0.189	0.047
15 ml aloe vera extract per liter of water	0.048	0.046	0.047	0.048	0.189	0.047
25 ml aloe vera extract per liter of water	0.047	0.048	0.047	0.057	0.199	0.050
GRAND TOTAL					0.769	
GRAND MEAN						0.192

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	COMPUTED F	TABULATED F	
					0.05	0.01
Treatment	3	0.00001589	0.00000530	0.81 ^{ns}	3.49	5.95
Error	12	0.00007871	0.00000656			
TOTAL	15	0.00009460				

ns=not significant

Coefficient of variation= 5.330046



Appendix Table 2. Average final weight of the birds (kg)

TREATMENT	REPLICATIONS				TOTAL MEAN	
	I	II	III	IV		
Water (control) without antibiotic	1.843	1.820	1.865	1.921	7.449	1.862
Water with commercial antibiotic	1.777	1.746	1.868	1.804	7.195	1.799
15 ml aloe vera extract per liter of water	1.769	1.856	1.824	1.746	7.195	1.799
25 ml aloe vera extract per liter of water	1.916	1.940	1.830	1.762	7.448	1.862
GRAND TOTAL					29.287	
GRAND MEAN						7.322

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	COMPUTED F	TABULATED F	
					0.05	0.01
Treatment	3	0.01606569	0.00535523	0.56 ^{ns}	3.49	5.95
Error	12	0.04130025	0.00344169			
TOTAL	15	0.00009460				

ns=not significant

Coefficient of variation= 3.205021



Appendix Table 3. Average gain in weight of the birds (kg)

TREATMENT	REPLICATIONS				TOTAL	MEAN
	I	II	III	IV		
Water (control) without antibiotic	1.794	1.772	1.818	1.874	7.258	1.815
Water with commercial antibiotic	1.730	1.698	1.822	1.756	7.006	1.752
15 ml aloe vera extract per liter of water	1.721	1.810	1.778	1.698	7.007	1.752
25 ml aloe vera extract per liter of water	1.869	1.892	1.783	1.716	7.260	1.815
GRAND TOTAL					28.531	
GRAND MEAN						7.134

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	COMPUTED F	TABULATED F	0.05	0.01
Treatment	3	0.01593969	0.00531323	1.53 ^{ns}	3.49	5.95	
Error	12	0.04168075	0.00347340				
TOTAL	15	0.05762044					

ns=not significant

Coefficient of variation= 3.305066



Appendix Table 4. Average feed consumption of the birds (kg)

TREATMENT	REPLICATIONS				TOTAL	MEAN
	I	II	III	IV		
Water (control) without antibiotic	4.278	4.277	3.857	4.285	16.697	4.174
Water with commercial antibiotic	4.189	4.220	4.228	4.254	16.891	4.223
15 ml aloe vera extract per liter of water	4.810	4.810	4.280	4.810	18.710	4.678
25 ml aloe vera extract per liter of water	4.776	4.780	4.200	4.187	17.943	4.486
GRAND TOTAL					70.241	
GRAND MEAN						17.561

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	COMPUTED F	TABULATED F	
					0.05	0.01
Treatment	3	0.66537969	0.22179323	3.86*	3.49	5.95
Error	12	0.68879325	0.05739944			
TOTAL	15	1.35417294				

* = significant

Coefficient of variation = 5.457366



Appendix Table 5. Average feed conversion ratio of the birds (FCR)

TREATMENT	REPLICATIONS				TOTAL	MEAN
	I	II	III	IV		
Water (control) without antibiotic	2.385	2.414	2.122	2.287	9.208	2.302
Water with commercial antibiotic	2.421	2.485	2.321	2.423	9.650	2.413
15 ml aloe vera extract per liter of water	2.795	2.795	2.407	2.833	10.830	2.708
25 ml aloe vera extract per liter of water	2.555	2.526	2.356	2.440	9.877	2.469
GRAND TOTAL					39.565	
GRAND MEAN						9.892

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	COMPUTED F	TABULATED F	
Treatment	3	0.35156919	0.11718973	6.61*	0.05	0.01
Error	12	0.21269675	0.01772473		3.49	5.95
TOTAL	15	0.56426594				

* = significant

Coefficient of variation = 5.382560



Appendix Table 6. Average water consumption of the birds (l)

TREATMENT	REPLICATIONS				TOTAL	MEAN
	I	II	III	IV		
Water (control) without antibiotic	97.66	97.66	97.70	97.73	390.75	97.69
Water with commercial antibiotic	97.65	97.68	97.70	97.73	390.76	97.69
15 ml aloe vera extract per liter of water	97.54	97.73	97.63	97.51	390.41	97.60
25 ml aloe vera extract per liter of water	97.59	97.73	97.52	97.48	390.32	97.58
GRAND TOTAL					1,562.24	
GRAND MEAN						390.56

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	COMPUTED F	TABULATED F	0.01
Treatment	3	0.03974419	0.01324806	2.17 ^{ns}	3.49	5.95
Error	12	0.07313775	0.00609481			
TOTAL	15	0.00009460				

ns=not significant

Coefficient of variation= 0.079956



Appendix Table 7. Mortality

TREATMENT	REPLICATIONS				TOTAL	MEAN
	I	II	III	IV		
Water (control) without antibiotic	10	10	0	10	30	7.5
Water with commercial antibiotic	10	10	10	10	40	10.0
15 ml aloe vera extract per liter of water	20	20	10	20	70	17.5
25 ml aloe vera extract per liter of water	20	20	10	10	60	15.0
GRAND TOTAL					200	
GRAND MEAN						12.5

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DEGREES OF FREEDOM	SUM OF SQUARES	MEAN OF SQUARES	COMPUTED F	TABULATED F	
					0.05	0.01
Treatment	3	250.0000000	83.3333333	4.00**	3.49	5.95
Error	12	250.0000000	20.8333333			
TOTAL	15	500.0000000				

**=highly significant

Coefficient of variation= 36.51484



Appendix Table 8. Return On Investment

ITEM	T ₀	T ₁	T ₂	T ₃		
A. Sales*						
1. Cubb Broilers			8,258.00	7,772.00	7,174.00	7,597.00
TOTAL SALES			8,258.00	7,772.00	7,174.00	7,597.00
B. Expenses						
1. Cost of stock			1,320.00	1,320.00	1,320.00	1,320.00
2. Cost of feeds			4,470.00	4,409.00	4,375.00	4,405.00
3. Cost of aloe vera			0.00	0.00	127.00	270.00
4. Cost of antibiotics			0.00	400.00	0.00	0.00
5. Bulbs			300.00	300.00	300.00	300.00
6. Disinfectant			30.00	30.00	30.00	30.00
7. Newspapers			35.00	35.00	35.00	35.00
C. Labor Cost**			985.00	985.00	985.00	985.00
TOTAL EXPENSES			7,140.00	7,479.00	7,172.00	7,345.00
C. Net Income			1,118.00	293.00	2.00	252.00
ROI(%)			15.66	3.92	0.03	3.43

ASSUMPTIONS:

*- total sales of the birds after 42 days of experiment at a price of 120 Php per kilo.

** - labor cost 3 hours per day within 42 days at wage rate of 250 Php per day.



Appendix Table 9.

Benguet State University
COLLEGE OF VETERINARY MEDECINE
La Trinidad, Benguet

VETERINARY NECROPSY PROTOCOL

Owner: FRANCIS, Saturnino M.
Address: Pico, La Trinidad, Benguet

Date: February 17, 2012

IDENTIFICATION

Specie: Avian Breed: Broiler Sex: _____ Age: 34 days old
Patients name: _____ Color: White Identification mark: _____
Tag no. _____ Hours intervening between death and autopsy _____

CLINICAL DIAGNOSIS:

RESPIRATORY PROBLEM

NECROPSY DIAGNOSIS:

CHRONIC RESPIRATORY DISEASE (CRD)

CLINICAL ABSTRACT

One broiler was brought to BSU animal hospital for necropsy due to increased deaths in the flock. Based on history and clinical signs observed, the initial finding was respiratory problem. Necropsy findings revealed wet vent, beak with mucous discharge, apparently enlarged lymph nodes, ischemic visceral pleura with mucous discharge, ischemic pericardium and epicardium, enlarged edematous heart, which are suggestive of Chronic Respiratory Disease (CRD).



Melly Ann Salic-o

Prepared by:

Lic # 6274 /Resident Veterinarian

