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Banana leaves as greens in fattening Turkey

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Abstract
A study to evaluate the effect of banana leaves as greens in fattening turkey was conducted. Two groups consisting of 6 Turkeys per group were used in the study. Group A received no banana leaves while group B were given fresh banana leaves ad libitum. No significant difference was observed between the two groups in terms of weight gain which was analyzed and evaluated by T-test. However, significant differences were observed in meat quality in terms of texture and general acceptability by 5 hedonic scales and T-test. Highly significant differences were observed on juiciness and odor of the meat but no significant difference was observed in terms of tenderness. Banana leaves did not improve the weight gain of the animals but good results were obtained on meat quality.

Keywords: ad libitum, banana leaves, fattener, greens, meat quality, weight gain

Introduction

Turkey is one of the most important poultry species raised for meat. Turkey commands high prices in the market both as dressed and live products. Researches about Turkey in the Philippines, is limited even though there is a great potential in the production and market of this highly priced bird. Improvement of meat quality of the locally produced turkey is a primary concern since it is not comparable with the quality of imported turkey meat.

To attain good quality, meat banana leaves as greens in confined fattening turkey should be considered as it adds macro and micronutrients including flavonoids. Banana (*Musaceae*) is one of the world's most important fruit crops, widely cultivated in tropical countries for its valuable applications in food industry. Its enormous by-products are excellent source of highly valuable raw materials for other industries by recycling agricultural waste. This prevents an ultimate loss of huge amount of untapped biomass and environmental issues [3].

It is important that all available by-products be turned into highly commercial outputs in order to sustain this renewable resource and provide additional income to small scale farming industries without compromising its quality and safety in competing with other commercial products. Banana leaves are abundant and those that are removed during clearing operation in banana plantation and the cleaning of the banana plant were just burned. This otherwise waste material is an important resource since it could be utilized as greens for fattening turkey.

Banana leaves, which grow continuously from the center of the stem, are broad blades, 1-4 m long x 0.7-1 m wide, with a pronounced supporting midrib contain about 85% water and 10 – 17% Crude protein (DM basis) also a source of flavonoids. The unique nutrient richness of every whole, natural food can be showcased in a variety of ways. But there is no better way to highlight the unique nutrient richness of foods than to focus on their flavonoid content. Flavonoids are a remarkable group of phytonutrients that fall into the chemical category of polyphenols. As a group, flavonoids are highly bioactive and play a wide variety of different roles in the health of plants, animals, and human health.

The flavonoid nutrient family is one of the largest nutrient families known to scientists. Over 6,000 unique flavonoids have been identified in research studies, and many of these flavonoids are found in plants that are routinely enjoyed in delicious cuisines throughout the world. In terms of nutrient richness, there were far more flavonoids from plant foods than from animal foods, and in particular, vegetables and fruits can be especially nutrient-rich in this type of phytonutrient.

Flavonoids are best known for their antioxidant and anti-inflammatory health benefits as well as the support of the cardiovascular and nervous systems. Because they also help support detoxification of potentially tissue-damaging molecules, their intake has often, although not always, been associated with decreased risk of certain types of cancers, including lung and breast cancer [6]. Banana leaves and petioles are sometimes called banana tops. Banana production yields large quantities of forage biomass. For an average crop fruiting 1.5 times a year, forage biomass can amount to 13 tons/ha/year [1].

World feed resources are on the verge of rapid decline, caused probably by increase in the number of humans and human activities. Hence, it is inevitable that conventional animal feeds should become increasingly more expensive. This has led to a search for new, often unconventional feeds that could supplement if not a substitute to conventional feedstuffs. Vegetable-based feeds are rich sources of essential plant amino acids, vitamins, minerals and antioxidants. In addition to the bioavailability of these essential nutrients, the green vegetables are the cheapest and most abundant source of proteins because of their ability to synthesize amino acids from a wide range of virtually available primary materials such as water, carbon dioxide, and atmospheric nitrogen.

Low fat and high protein meat can be obtained from birds fed with experimental vegetable feed than those fed with commercial broiler's starter mash. Therefore, the vegetable-based products serve as a source of the essential ingredients required by poultry farmers during the formulation of Turkey feed. The vegetable feed formula may enhance the poultry meat products in terms of nutritive value that would in the long run be beneficial to the health of meat consumer's and possibly serve as a source of economic value to the poultry farmers.

Vegetable-based products including banana leaves in poultry feed formula would serve as a cheap source of amino acids, antioxidants, vitamins minerals and bioactive metabolites, that are necessary for the growth and development of Turkey. The production of such birds could in turn improve the health status of meat-eaters by boosting their immunity. This would contribute greatly towards the prevention and reduction of neurodegenerative diseases associated with lipid-rich diet. Hence, the adoption of green vegetables and vegetable pulp substitutes for pre-mixed vitamins during feed formulation would serve as a cheap and natural source of ingredient in poultry feed formulation for small scale farmers [5].

Materials and Methods

Twelve heads of turkey were used in the study. The experimental birds were grouped into two, A and B. Group A was not given fresh banana leaves while group B was given fresh banana leaves *ad libitum*. The feeding trial lasted for 8 months. The initial and final weights of the experimental birds were gathered and recorded and were used to determine the weight gain.

Hedonic testing (5-point hedonic scale) was employed to assess meat quality after slaughter. Fifteen professional food tasters were contracted to perform the hedonic testing. Sensory testing was done in a clear area that is away from noise and cooking smells which may distract the people taking part in the test. Many samples were placed in serving containers which corresponds to the number of people taking part or commissioned for the test and the samples were coded with letters. Water was ensured to be enough for the people taking part. Testers know what was expected of them by explaining to them very well the mechanics of the test. They were asked to taste one sample at a time and record their responses. Enough time was allowed between samples so that tasters can record their opinions. All gathered data were analyzed using T-test at 5% and 1% level of significance.

Results and Discussions

Body weight and weight gain

The growth performance of turkey in terms of weight gain was not affected by the banana leaves in the diet as the weight gain of the experimental birds in Group A and B were not significantly different (Table 1 and 2). Turkey attained reasonable weight gain even in the absence of banana leaves. The types of feeds for turkey regardless of the base ingredients have influence in their growth performance. As long the birds consumed any kinds of fodders, these significantly shows effect in their weight. Moreover, the rate of consumption of feeds in time, and turkey's health and age for their digestibility greatly affects their gain in terms of weight [2].

Table 1: Final weight and gain in weight as affected by supplementing fresh banana leaves

Treatment	Initial Body Weight (kg)	Final Body Weight (kg)	Gain in Weight (g)
Without fresh banana leaves	2.52	8.35	5.83[a]
With *ad libitum* fresh banana leaves	2.48	8.36	5.88[a]

Means within column with similar superscript has no significant differences ($p>0.05$)

Table 2: T-test for gain in weight

Treatment	Standard Deviation	t-Computed	t-Tabular	
			5%	1%
A – 5.83	±0.408	0.246[ns]	1.812	2.764
B – 5.88	±0.286			

Meat quality

With respect to the meat quality parameters only the tenderness was not positively affected by the consumption of banana leaves (Table 3 and 4). This means that the meat of turkey supplemented with *ad libitum* banana leaves as greens is as tender as those from birds non given with fresh banana leaves in the diet. However, the texture, juiciness, odor and general acceptability are positively affected by the consumption of banana leaves. Banana leaves have not largely influenced the weight gain of turkey but meat quality was improved leading to better consumer acceptability.

Table 3: Organoleptic properties of turkey as affected by supplementing fresh banana leaves

Treatment	Texture	Tenderness	Juiciness	Odor	General Acceptability
WFBL	3.67^{b}	4.00^{a}	3.83^{b}	3.83^{b}	3.50^{b}
ADFBL	4.50^{a}	4.50^{a}	4.83^{a}	4.67^{a}	4.50^{a}

Means within column with different superscript are significant different ($p>0.05$); WFBL - Without fresh banana leaves; ADFBL - With ad libitum fresh banana leaves

Table 4: T-test for organoleptic properties of turkey fed with and wothout fresh banana leaves

Parameters	Mean		Standard deviation		t-computed	T tabular	
	A	B	A	B		5%	1%
Texture	3.67	4.50	0.516	0.548	2.712	Significant	
Tenderness	4.00	4.50	0.632	0.548	1.464	Not significant	
Juiciness	3.83	4.83	0.408	0.408	4.243	Highly significant	
Odor	3.83	4.67	0.408	0.516	3.101	Highly significant	
Gen acceptability	3.50	4.50	1.049	0.548	2.070	Significant	

The presence of heart-healthy flavonoids, which occur naturally in plant foods, does not automatically increase bitterness; in fact, it is possible to enhance some good flavor pathways while limiting others, including fewer desirable smells, by the addition of flavonoids. Results indeed revealed that the natural heart healthy flavonoids found in banana leaves, improved the quality of turkey meat. The otherwise agricultural waste banana leaves, used as greens in fattening turkey, was proven to be effective in improving quality of their meat [4].

Conclusions

Banana leaves for turkey can be used as alternative fodders due to the improvement of the turkey meat quality. The study shows that the turkeys fed by banana leaves have obtain positive acceptability in terms of their juiciness, texture and odor. On the other hand, their weight is not affected at all regardless of the type of feeds given to the birds. This is an indication that in terms of feed types, as long it is edible for the turkeys, gain in their body weight is expected.

References

1. Ffoulkes D, Espejo S, Marie D, Delpeche M, Preston TR. The banana plant as cattle feed: composition and biomass production. Trop. Anim. Prod. 1977; 3(1):45-50. Retrieved from http://www.utafoundation.org/tapindex.htm.
2. Megan LR, Dervan DB, Abbott AA, Classen HL. Effect of protein sources on performance characteristics of turkeys in the first three weeks of life, Animal Nutrition. 2019; 5(4):396-406.
3. Padam, Birdie Scott, Hoe Seng Tin, Fook Yee Chye, Mohd Ismail Abdullah. Banana by-products: an under-utilized renewable food biomass with great potential. School of Food Science and Nutrition, Universiti Malaysia Sabah, Jalan UMS, 88400 Kota Kinabalu, Sabah Malaysia, 2016. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/?term=Padam%20BS%5BAuthor%5D&cauthor=true&cauthor_uid=25477622.
4. Preidt Robert. Flavonoids Can Taste Good Too. Penn State University, 2003. Retrieved from www.consumer.healthday.com/vitamins-and-nutritional-information-27/food-and-nutrition-news-316/flavonoids-can-taste-good-too-514982.html
5. Payne, WJA & Wilson, RT. An Introduction to Animal Husbandry in the Tropic. Blackwell Science Limited, London.59- 616. 1999. Retrieved from http://www.bioline.org.br/request?nd10005.
6. Whfood Organization. Flavonoids the worlds healthiest food, 2016. Retrieved from http://www.whfoods.com/genpage.php?tname=nutrient&dbid=119.