

CARCASS CHARACTERISTICS OF BROILER CHICKENS FED DIETS CONTAINING COMBINATIONS OF *Mentha piperita* AND *Adansonia digitata* AS PHYTOGENIC FEED ADDITIVES

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Abstract

This study evaluated the carcass characteristics of broiler chickens fed diets containing combinations of *Mentha piperita* (peppermint) and *Adansonia digitata* (baobab) leaf meals as phytogetic feed additives. Four hundred (400) day-old Cobb 500 broiler chicks were randomly allotted to five dietary treatments with three replicates of twenty-seven birds each in a completely randomized design. The treatments consisted of a control diet (T1), diets containing combinations of peppermint and baobab leaf meals at 75:25 (T2), 50:50 (T3), 25:75 (T4), and a diet containing oxytetracycline (T5) as an antibiotic growth promoter (AGP). Results revealed significant ($p < 0.05$) differences in live weight, dressed weight, and organ weights such as gizzard, lungs, kidney, and fat, while liver and heart weights were not significantly affected ($p > 0.05$). Birds fed diets containing 50:50 combinations of *Mentha piperita* and *Adansonia digitata* recorded the highest live and dressed weights, comparable to those on the antibiotic diet. The findings suggest that the synergistic inclusion of peppermint and baobab leaves can effectively improve carcass yield and organ development in broilers, serving as a natural alternative to synthetic growth promoters.

Keywords: *Mentha piperita*, *Adansonia digitata*, phytogetic additives, carcass yield, broiler chicken.

Description of Problem

Plants feed additives have been reported to enhance performance, feed conversion ratio, carcass meat safety and quality in animals [1]. Besides enhancing performance, they also have anti-oxidant properties, the effects of which are associated with essential oils (EOs) and their components [2]. Phytogetics have beneficial effects on nutrient utilization possibly by stimulating digestive enzymes such as lipase, amylase, or protease and improve gastrointestinal morphology [3]. Phytochemical analysis of these botanicals have shown the presence of essential oil and phytochemicals that improved performance and reduced bacterial load in non-ruminant livestock [1].

Methodology

The experiment was conducted at the Poultry Unit of the Department of Animal Science Teaching and Research farm, Ahmadu Bello University, Zaria, Kaduna State. Zaria is in the Northern Guinea Savannah zone, located on longitude 11° 09' 01.78" N and 7° 39' 14.79" E and 671m above sea level. The climate is characterized by a well-defined dry and wet

seasons. The climate is relatively dry with a mean annual rainfall of 700-1400mm [4]. Four-hundred-day old Cobb 500 broiler chicks were allotted to five dietary treatments with 3 replicates of 27 birds each in a completely randomized design (CRD). The birds were housed in deep litter pens and managed with all necessary routine management practices. Feed and water were provided *ad libitum* throughout the experimental period. Five treatment diets was formulated for the starter and finisher phases respectively containing combinations of peppermint leaf meal and baobab leaf meal with T1: Standard diet (Control), T2: Standard diet containing 75% peppermint leaf meal + 25% baobab leaf meal, T3: Standard diet containing 50% peppermint leaf meal + 50% baobab leaf meal, T4: Standard diet containing 25% peppermint leaf + 75% baobab leaf meal and T5: Standard diet containing Oxytetracyclines.

Results and Discussion

Carcass characteristics of broiler chickens fed diets containing combinations of *Mentha piperita* and *Adansonia digitata* as phytogetic feed additives

The carcass characteristics of broiler chickens fed diets containing combinations of *Mentha*

piperita and *Adansonia digitata* is presented in Table 1. There were significant ($p < 0.05$) differences in live weight, dressed weight, cut parts and some organs like gizzard, lungs, kidney and fat. Organs like heart and liver show no significant ($p > 0.05$) difference across the dietary treatments. The results obtained showed that birds fed diet containing the AGP and combinations of *Mentha piperita* and *Adansonia digitata* at 50:50g/100kg had higher live weight and dressed weight than those of other dietary treatments. Organ weights were significantly ($p < 0.05$) higher for birds fed diets containing combinations of *Mentha piperita* and *Adansonia digitata* and AGP. The enlargement of these organs may be due to their involvement in detoxification of the materials and hence may also confers superior benefits.

The improved carcass yield and organ weights observed may be attributed to the synergistic

effects of the phytochemicals, essential oils, and antioxidants present in the two botanicals, which enhance nutrient utilization, digestion, and metabolism. Studies have reported that the use of antibiotics as a growth promoter has ability to improve weight gain as well as carcass yield of birds [5]. The result is in agreement with Khaksar *et al.* [6] who reported significant improvements in some carcass traits due to inclusion of thyme essential oils. However, Schulze *et al.* [7] did not observe a significant effect in the broiler carcass yield due to the dietary inclusion of essential oil blend based on thyme and cinnamon. Also Muhl and Liebert [8] did not find differences in the carcass yield of broilers fed plant extracts and combinations of plant extracts.

Table 1: Carcass evaluation of broiler chickens fed diets containing combinations of *M. piperita* and *A. digitata* as phytogenic feed additives

Parameters	Combination of <i>M. piperita</i> and <i>A. digitata</i>				Oxytet	SEM
	0	75:25	50:50	25:75		
Live weight (g)	2466.67 ^c	2666.67 ^{ab}	2693.33 ^a	2600.00 ^b	2723.33 ^a	31.55
Dressed weight (g)	1684.67 ^c	1913.33 ^b	1994.00 ^a	1896.33 ^b	2040.00 ^a	32.66
Dressing %	68.29 ^c	71.77 ^b	74.04 ^a	72.98 ^{ab}	74.90 ^a	1.24
Standard cuts expressed as % of dressed weight						
Breast	27.64 ^b	32.39 ^a	25.72 ^b	30.55 ^a	26.03 ^b	1.55
Back	15.39 ^b	17.57 ^a	16.21 ^{ab}	17.25 ^a	13.85 ^c	0.76
Thigh	16.02 ^a	14.85 ^a	13.69 ^b	15.30 ^a	13.82 ^b	0.83
Drumstick	14.49 ^a	13.60 ^a	14.02 ^a	11.75 ^b	13.03 ^{ab}	1.06
Organs expressed as % of live weight						
Gizzard	2.20 ^a	1.69 ^b	1.75 ^b	2.04 ^a	2.09 ^a	0.17
Heart	0.51	0.54	0.45	0.45	0.46	0.06
Lungs	0.57 ^{ab}	0.56 ^{ab}	0.58 ^a	0.51 ^{ab}	0.48 ^b	0.05
Liver	2.14	2.19	2.19	2.07	2.27	0.24
Kidney	0.47 ^c	0.55 ^{bc}	0.57 ^b	0.58 ^b	0.69 ^a	0.05
Fat	2.35 ^c	1.47 ^b	0.53 ^a	0.90 ^a	0.62 ^a	0.21

^{abc}Means with the same superscripts along the rows are not significantly different ($p > 0.05$), SEM: standard error of means.

Conclusion and Application

The combination ratio of 50:50 yielded the best carcass performance, comparable to birds fed antibiotic growth promoters. Hence, these natural additives can serve as effective replacements for antibiotics in broiler production, thus promoting healthier meat and reducing antimicrobial residue concerns. Based on the findings, it is recommended that a 50:50

combination of *Mentha piperita* and *Adansonia digitata* leaf meals be incorporated into broiler diets as a phytogenic feed additive to improve carcass yield and promote antibiotic-free poultry production.

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