American Journal of Biology and Natural Sciences
https://biojournals.us/index.php/AJBNS
ISSN: 2997-7185

Impact of Varying Concentrations of Myrtle Leaf Powder Aqueous Extract on Certain Chinese White Duck Carcass Characteristics

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Received: 2025, 15, Jun
Accepted: 2025, 21, Jul
Published: 2025, 12, Aug

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Annotation: A private Peking duck farm in Al Muthanna Governorate was occupied for this research study, from November 3rd, 2024, to December 2nd, 2025. For this study, we used sixty non-sexed, 1-day-old, 42-gram Peking ducklings. The ducklings were randomly distributed into four treatments, with three replicates each (5 ducklings in each replicate). The treatments were the following: a control treatment of no added materials - T1, and all treatments with an aqueous extract of powdered myrtle added in drinking water, T2 for 10 ml/liter, T3 for 20 ml/liter, and T4 for 30 ml/liter. The aqueous extract of myrtle leaves showed a significant improvement (P≤0.05) on all carcass traits, including dressing percentages with and without giblet (heart, liver, and gizzard) and the two main cuts (breast and thigh), and showed a significant difference (P≤0.05) in significantly reduced

secondary cuts (neck, wings, and back for control) for the aqueous extract. The highest value in dressing percent and main cuts was achieved when the powdered myrtle was added to treated drinking water at 30 ml/liter, compared to all treatments in the experiment.

Keywords: aqueous extract, myrtle leaves, carcass, Chinese white ducks.

Introduction:

Researchers are seeking to discover new, available natural materials, for some, natural medicines derived from medicinal plants are the only treatment option. They are used as raw materials in the pharmaceutical industry (Al Salman and Al-Gharawi, 2019;; Alkenany *et al*., 2021). The widespread use of medicinal plants is due to several reasons: Fewer side effects and better patient acceptance, due to traditional medicine advice, their compatibility with the body's physiological functions, and their low cost (Al-Gharawi and Ebade, 2020; Al-Gharawi and Al-Salman, 2023).

Myrtle has had and continues to have many uses in folk medicine, and almost all parts of the plant are used for their many benefits (Olga *et al*., 2008). The fruits have been used to treat coughs, stomach ailments, gum disease, appetite stimulants, and external wound healing. They are also used as antiseptics, astringents, analgesics, hair tonics, and stimulants (Nadkarni, 1989; Kirtikar and Basu, 1988).

Greek medicine mentions that 3-5 grams of the fruit is sufficient to treat diarrhea, dysentery, internal ulcers, rheumatism, foot ulcers, hair loss, bronchitis, burns, cough, earache, toothache, headache, palpitations, burning urination, eye ulcers, bad breath, and peptic ulcers (Baumann, 1993). Other sources mention it as a carminative, antiemetic, diuretic, anti-inflammatory, antidote, antidiabetic, cardiotonic, and cerebral tonic (Chalchat *et al*., 1998).

Numerous studies have confirmed that the myrtle plant can act as an antioxidant. These studies have focused primarily on phenolic compounds found in the plant. These compounds are byproducts of plant metabolism that possess pharmacological or medicinal activity. They have various biological effects, acting as antioxidants, antimicrobials, antifungals, and vasodilators. These compounds can act as antioxidants by donating hydrogen to active radicals, thereby preventing the formation of radicals (Rice *et al*., 1995; Chu *et al*., 2000).

The present study aims to demonstrate the effect of different levels of aqueous extract of powdered leaves of myrtle on some carcass traits of Chinese white ducks.

Materials and Methods:

The study was conducted at a private duck farm in Muthanna Governorate from November 3, 2024, to December 2, 2025. The ducklings were sourced from the local market in Diwaniya Governorate, and a total of sixty one-day-old, unsexed Peking ducklings weighing 42 gm were used in the experiment. We raised the ducklings in a 25 × 10 m hall. The ducklings were randomly divided into four treatments with three replicates (5 ducklings each), placing them in 12 pens of 1.5 × 1 m. Experimental parameters were:

T1: Control treatment (no addition) in drinking water.

T2: Add 10 ml/L of aqueous extract of myrtle leaves to drinking water.

T3: Add 20 ml/L of aqueous extract of myrtle leaves to drinking water.

T4: Add 30 ml/L of aqueous extract of myrtle leaves to drinking water.

Peking ducklings were raised in 1.5×1 m coops, each containing 5 Chinese ducklings (each coop representing one replicate for each treatment). Temperature was maintained using gas incubators, with temperature monitored using a mercury thermometer from one day of age until marketing (60 days). Feed and water were provided ad libitum. Throughout the first three days after the chicks' hatching, they were kept under continuous lighting for 23 hours per day, one hour of which was allowed for acclimation, to reduce the possibility of restlessness and crowding. The amount of light was changed to a schedule of 16 hours of light and 8 hours of darkness. The breed guide suggests the use of plastic pressed feed dishes measuring 38 cm in diameter for the first week. During the first week, one dish was used for each replicate, before being gradually replaced with suspended plastic cylindrical feeders. Inverted 5-liter plastic troughs were used throughout the experiment. Wood shavings were used as bedding, for the floor.

At the end of the experiment, samples of eight birds were selected from each treatment after a 4-hour feed break. The live weight of each bird was then taken. The birds were then slaughtered, and the feathers, head, and legs were removed. The carcasses were thoroughly cleaned of internal organs, then, they were individually weighed to calculate the ratio of dressing (without giblet) to live body weight (with internal organs (heart, liver, and gizzard) (Al-Fayyad and Naji, 1989).

After the carcasses were weighed to calculate the net percentage, they were cut into the main cuts (breast and thigh) and the secondary cuts (back, wings, and neck), as reported by Al-Fayyad and Naji (1989).

Results and Discussion:

The study presented in Table 1 evaluated the influence of the aqueous extract of myrtle leaf powder on the hog of the giblets of a 60-day-old Chinese white duck. It was shown that body weight was higher ($P \leq 0.05$) in all treatments with aqueous extract of myrtle leaf powder compared to the control treatment (T1). Treatment T4 was significantly higher ($P \leq 0.05$) with an average of 865.77 gm compared to T2, 837.63 gm average, and T1, the control treatment average of 763.15 gm. There were no significant differences despite T4 showing a feed conversion that featured T2, but T2 and T3 showed no significant differences as treatments T3 and T4 .

For dressing ratio no giblet, treatment T4 showed a significant increase ($P \leq 0.05$) at 64.729% compared to treatment T2 at 62.514%, plus T2 increased ($P \leq 0.05$) compared to the control treatment on average of 62.514%. There were no significant differences, and despite T4 showing a trend at T2 and T2, compared to T3, only a substantial increase in dressing was observed in T4 compared to T3 .

For relative weight, heart, liver, and gizzard, both T4 and T3 showed a ($P \leq 0.05$) significant difference compared to before and after treatments. Lastly, heart T1 was 0.221% while T2 was 0.240%, % increase in T4 of 0.261%, at 0.285% was the control treatment. Heart dress weight and liver relative weight: T1 1.672% while T2 1.705% and T4 1.776%; T1, the control, got 1.371%. Finally, gizzard relative weights were T1 1.371%, T2 1.485%, T3 1.526% and T4 1.574%.

Regarding dressing ratio with giblet trait, results revealed that the all treatments of aqueous extract of powder of leaves of myrtle were statistically higher ($P \leq 0.05$) than the control treatment where the significant ($P \leq 0.05$) superiority of T4 (68.364%) was also shown over T3 (67.376%) and T3 had a significant ($P \leq 0.05$) superiority over T2 (66.577%) and T2 was significantly ($P \leq 0.05$) higher than the lowest control treatment (65.778%).

Table (1) Effect of different levels of aqueous extract of powdered leaves of myrtle on dressing ratio with or without gibletof 60-day-old Chinese white ducks carcass.

Traits	Treatments				SE of means	Sig.
	T1	T2	T3	T4		
Hot body weight (gm)	763.15 c	814.22 b	837.63 ab	865.77 a	11.048	0.0013
Dressing ratio without giblet (%)	62.514 c	63.147 b	63.858 ab	64.729 a	0.169	0.0141
Heart relative weight (%)	0.221 d	0.240 c	0.261 b	0.285 a	0.002	0.0032
Liver relative weight (%)	1.672 d	1.705 c	1.731 b	1.776 a	0.005	0.0016
Gizzard relative weight (%)	1.371 d	1.485 c	1.526 b	1.574 a	0.007	0.0026
Dressing ratio with giblet (%)	65.778 d	66.577 c	67.376 b	68.364 a	0.209	0.000

Our findings revealed a statistically substantial increase in carcass weight, a significant ($P<0.05$) increase in dressing percentage (with and without gizzards), and an important ($P<0.05$) relative weight of gizzard (heart, liver, and gizzards included). The dressing percentage of aqueous extract of myrtle leaf powder may significantly improve, due to the increase in body weight gains as there is a positive correlation between body weight and dressing percentage (Tang et al., 2012). The significant ($P<0.05$) increase in liver, heart, and gizzard weight may be due to the actions of myrtle's active ingredients that can enhance the metabolism of fats, carbohydrates, and proteins in primary metabolic organs such as the liver which might have increased tissue growth and development in the organs subsequently increasing their weights (Anonymous, 1997; Mellor, a, b, 2000).

These findings were consistent with that of Alcicek et al. (2003), who noticed substantial improvement ($P\leq0.05$) of the dressing percentage for broiler chickens in the treatment in which the myrtle leaf oil was used at the rate of 48 mg/kg. The dressing percentage reached 75.21% for this treatment compared to 71.94% for the control treatment. The results also agreed with Biricik et al. (2012), who found that quails fed diets supplemented with different levels of myrtle leaf oil showed significantly higher ($P\leq0.05$) relative weight of organs in all treatments compared to the control treatment during the 42-day rearing period. They were morally consistent with Faroun (2016), who used the aqueous extract from the leaves of the myrtle plant at a rate of 300 ml/liter of drinking water and obtained a dressing percentage of 72.66% in the purging of the viscera while the control treatment reached 69.32% with significant improvement ($P\leq0.05$) of the relative weight of the heart, gizzard and liver (0.410, 2.04 and 2.40 vs. 0.284, 1.63 and 1.94, for control treatment), while overall observed results in this study did not agree with Hernandez et al. (2004) regarding broiler chickens as they found no statistically significant differences in dressing percentage and relative weight of liver, heart, and gizzard .

Table (2) shows the effect of different levels of aqueous extract from powdered leaves of the myrtle plant on the relative weight of the primary and secondary cuts from the carcasses of 60-day-old white ducks. The results showed a ($P\leq0.05$) significant increase in the primary cuts (breast and thigh) of the aqueous extract of myrtle leaves in all treatments compared to the control treatment. T4 showed a significant increase ($P\leq0.05$) compared to T3, which was significantly higher ($P\leq0.05$) than T2, which was significantly higher ($P\leq0.05$) than the control treatment. As for the primary cuts, the relative weights of the breast dissected were 25.49, 25.88, 26.33, and 26.82%, while the relative weights of the thigh taken were 26.07, 26.65, 27.19, and 27.76% for treatments T1, T2, T3, and T4, respectively .

The results as they pertain to secondary cuts, represented by the relative weights of the neck, wings, and back, were significantly lower (P≤0.05) in T4 relative to T3, at the expense of T2, whose relative weights were observed to be significantly lower (P≤0.05) compared to the control treatment. The neck relative weights taken for T1, T2, T3, and T4 show (6.86, 6.42, 6.13, and 5.81%, respectively), while wing relative weights show 13.76, 13.39, 12.99, and 12.42% as taken for T1, T2, T3, and T4, respectively. The back relative weights for T1, T2, T3, and T4 were 27.81, 27.64, 27.35, and 27.18%, respectively.

Table (2) The influence exerted by varying levels of aqueous extract derived from powdered myrtle leaves on the relative weights attributed to primary and secondary cuts of carcasses in Chinese white ducks aged 60 days..

Traits	Treatments				SE of means	Sig.
	T1	T2	T3	T4		
Breast relative weight (%)	25.49 d	25.88 c	26.33 b	26.82 a	0.059	0.0030
Thigh relative weight (%)	26.07 d	26.65 c	27.19 b	27.76 a	0.082	0.0017
Neck relative weight (%)	6.86 a	6.42 b	6.13 c	5.81 d	0.003	0.0105
Wing relative weight (%)	13.76 a	13.39 b	12.99 c	12.42 d	0.005	0.0016
Back relative weight (%)	27.81 a	27.64 b	27.35 c	27.18 d	0.089	0.0090

The relatively higher proportion of the primary cuts noted for the myrtle aqueous extract treatment compared to the control treatment can primarily stem from a decrease in the proportion of fat in the abdominal region, in conjunction with a substantial enhancement in total body weight. Since the relative weight of the primary cuts is a major percentage of carcass weight (Washburn, 1991), the enhancement in relative weight of the primary cuts may be attributed to a direct correlation between body weight and dressing percentage as well as the body weight and weight of the primary cuts. The greater the body weight, the proportionate increases in the relative weight of carcass cuts (Al-Fayyad and Naji, 1989) .

These findings were consistent with Mahmoodi et al. (2014), in which they demonstrated the effect of varying levels of myrtle oil on the relative weight of the main cuts of the carcass. The treatment of safflower oil in the (300 mg/kg) demonstrated a significant advantage in weight of the thigh and breast pieces appreciated compared to the control treatment. Faroun (2016) noted that use of aqueous extract of myrtle leaf powder at a level of (300 ml/liter of drinking water) produced a significant response in the primary cuts; - breast, thigh, and drumstick - produced response proportional to 27.25, 16.18 and 12.90%, respectively compared to the control treatment 25.97, 15.42 and 12.38%, respectively. A significant decrease was also noted in secondary cuts; the back, wings, and neck in the treatment of aqueous extract of myrtle leaf powder at a level of (300 ml/liter of drinking water); the response proportional to: 25.85, 12.16, and 5.65%, compared to the control treatment at 27.07, 12.91 and 6.23% .

The results do not coincide with what Cabuk et al. (2006) suggested that there was no significant difference for the myrtle treatment compared to the control treatment on the weight of the main cuts on broiler chickens, and weight of the liver, heart and gizzard.

References:

1. Al Salman NTSh, Al-Gharawi, JKM (2019). Effect of eucalyptus leaves water extract on some productive traits of broilers. Plant Archives, 19(Suppl. 1), 920-923.

2. Alcicek A., M. Bozkurt and M. Cabuk. 2003. The effect of an essential oil combination derived from selected herbs growing wild in Turkey on broiler performance. South African Journal of Animal Science, 33 (2).
3. Al-Fayyad, H.A. and S.A. Naji, 1989. Poultry Products Technology. First Edition. Directorate of Higher Education Press. Baghdad.
4. Al-Gharawi JK, Ebade, JA (2020). Effect of different levels of cardamom oil in diet on some productive traits of layer hens. Plant Archives, 20(2), 4085-4088.
5. Al-Gharawi, J. K. M. and Al-Salman, N. T. Sh. 2023. Effect of local Aloe vera oil extraction on various broiler carcass characteristics. Bionatura Latin Amer. J. Biotech. & Life Sci., 8(1): 1–7.
6. Alkenany MH, Al-Ardhi SAA, Al-Gharawi JK (2021). Effect of Chia Seeds Water Extract on Some Physiological Traits of Broiler. IOP Conference Series. Earth and Environmental Science; Bristol, 932 (1).
7. Anonymous, 1997. CRINA® HC for poultry based on essential oils. Akso Nobel.
8. Baumann, H. 1993. The Greek Plant World: In Myth, Art and Literature, Timber Press, Portland, Oregon, United States.
9. Biricik H., D. Yesilbag, S.S. Gezen and T. Bulbul. 2012. Effects of dietary myrtle oil (*Myrtus communis* L.) supplementation on growth performance,meat oxidative stability, meat quality and erythrocyte parameters in quails. Revue Méd. Vét., 163(3) 131-138.
10. Cabuk M., M. Bozkurt, A. Alçiçek, Y. Akbaş and K. Küçükyılmaz. 2006. Effect of a herbal essential oil mixture on growth and internal organ weight of broilers from young and old breeder flocks. South African Journal of Animal Science, 36 (2).
11. Chalchat J, R. P. Garry and A. Michet. 1998. Essential oils of myrtle of the Mediterranean littoral, J Essent Oil Res. 10, 613-617.
12. Chu, Y.H.; Chang, C.L. and Hsu, H.F. 2000. Flavonoid content of several vegetables and their antioxidant activity. J. Sci. Food Agric., 80, 561–566.
13. Faroun, Z.K. (2016). The effect of using different levels of aqueous extract of myrtle leaves on some productive, immunological, histological and microbial traits of broiler chickens. Master's thesis, College of Agriculture, Al-Muthanna University.
14. Hernandez F, J. Madrir, V. Garcia, J. Orengo and M.D. Megias. 2004. Influence of two plant extracts on broiler performance, digestibility and digestive organ size. Poultry Science, 83: 169-174.
15. Kirtikar K.R., and B.D. Basu. 1988. Indian Medicinal Plants, 3rd Ed., International Book Distributors, Dehra Dun, Vol. II. 1040-1042.
16. Mahmoodi B.M., S. Ghazanfari, A. Salehi and S.D. Sharifi. 2014. Growth Performance, Carcass Characteristics, Antibody Titer and Blood Parameters in Broiler Chickens Fed Dietary Myrtle (Myrtus communis) Essential Oil as an Alternative to Antibiotic Growth Promoter, Poultry Science Journal, 2 (1): 37-49.
17. Mellor, S., 2000a. Antibiotic are not the only growth promoters. World poult., 16(No1) : 14-15.
18. Mellor, S., 2000b. Nutraceuticals-alternatives to antibiotics. World poult., 16(No2): 30-33.
19. Nadkarni K.M. 1989. Indian Materia Medica, 3rd Edn, Popular Prakashan Pvt. Ltd., Bombay, vol. 1. p.: 838.

20. Olga G., L. Stavros, C. Ioanna and T. John. 2008. Re-evaluation of bioactivity and antioxidant activity of extract before and after encapsulation in liposomes, Eur Food Res Technol. 226(3): 583-590.

21. Rice E. C.A., N.J. Miller, P.G. Bolwell and P.M. Bramley. 1995. The relative antioxidant activities of plant-derived polyphenolic flavonoids. Free Radical Research, 22, 375–383.

22. Tang, J.W., H. Sun, X.H. Yao, Y.F. Wu, X. Wang and J. Feng. 2012. Effect of replacement of soy bean meal by fermented cotton seed meat on growth performance , serum biochemical parameters and immune function of yellow-feathered broiler. Asian-Aust. J. Anim. Sci. 25. No. 3:393-400.

23. Washburn, K. W. 1991. Efficiency of feed utilization and rate of feed passage through the digestive system. Poult. Sci. 70: 447-452.