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### RESEARCH ARTICLE

## LIVE BODY WEIGHT, CARCASS AND ABDOMINAL FAT PERCENTAGE OF BROILER CHICKEN AFFECTED BY HERBAL DRINK

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#### Abstract

The aim of the research was to determine the live body weight, carcass percentage, and percentage of abdominal fat in broiler chicken affected by herbal drinks. One hundred twenty birds of DOC was used in the research. Basal diet contain of metabolizable energy 3000 kcal/kg and crude protein 22%. Experimental design used was completely Randomized Designed with 6 treatments and 4 replicates, every replicates consist of five 5 birds. The treatments were as follows: T0: control (without herbal drink), T1: basal diet + 10% of herbal drink, T2: basal diet + 20% of herbal drink, T3: basal diet + 30% of herbal drink, T4: basal diet + 40% of herbal drink and T5: basal diet + 50% of herbal drink. The parameters observed were live body weight, carcass percentage and abdominal fat percentage. The result showed that herbal drink significantly ( $p < 0.05$ ) increased live body weight and carcass percentage and decrease the abdominal fat percentage. The conclusion was herbal drinks increase the live body weight and carcass percentage and decrease the abdominal fat percentage of broiler chicken.

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#### Introduction:-

The prohibition of the utilization of antibiotic growth promoters (AGP) in the poultry diet because causes resistance to antibiotics and also increases residue in poultry products, so those were harmful to human health. The alternative of AGP were probiotics, prebiotics, synbiotic, organic acids, and phytobiotics. Phytobiotics are bioactive compounds that can be obtained from plants and can increase the animal growth [1]. The mixture of extract basil leaves, lime leaves, and lemongrass leaves were the herbs that can be used as alternative AGP at the poultry.

Basil leaves were herbs that contain bioactive compounds such as  $\beta$ -Caryophyllene and methyl eugenol [2]. Basil leaves can be act as antibacterial, antifungal, and antioxidant [3]. Lemongrass contains steroids, alkaloids, phenols, saponins, tannins, anthraquinones, and flavonoids [4]. [5], reported that extracts of lemongrass leaves have antimicrobial and antioxidant activity. Lime leaves also contain an alkaloid, flavonoid, terpenoid, tannin, saponin, limonoids, coumarins, glycerolipids, and  $\alpha$ -tocopherol compounds that as have potential as anti-tumor, anti-inflammatory, antioxidant and anticancer properties [6,7].

[8], reported the mixture of the extracts of basil, lemongrass, and lime leaves inhibition the growth of *Salmonella thypi* and *Staphylococcus aerus* bacteria. Another study by [9,10], showed that the utilization of a mixture extract of basil, lime, and lemongrass leaves up to a 50% concentration in drinking water increases the growth and decreases cholesterol and triglycerides levels at broiler chickens. Based on the benefits of these herbal drinks derived from a

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mixture of extract basil, lime, and lemongrass leaves were expected to increase the live body weight, carcass percentage, and reduce the percentage of abdominal fat at broiler chickens. The purpose of this study was to determine the live body weight, carcass percentage, and percentage of abdominal fat in broiler chickens affected by herbal drinks.

## Material and Methods:-

### Preparation of herbal drink

The herbal drink preparation conducted by the basil leaves, lime leaves, and lemongrass leaves weighed with the same ratio, washed, sliced, and ground. The mixture put in a 1000 ml beaker glass and added the water, closed for 24 hours, filtered, and added with brown sugar as much as 5% of the extract.

### In vivo Study

The study was used 120 bird of day old chick (DOC). The birds reared for 30 days and randomly place into 24 pens. The treatments of herbal drink in drinking water as follows T0: control (without herbal drink), T1: basal diet + 10% of herbal drink, T2: basal diet + 20% of herbal drink, T3: basal diet + 30% of herbal drink, T4: basal diet + 40% of herbal drink and T5: basal diet + 50% of herbal drink. Basal diet contain of metabolizable energy 3000 kcal/kg and crude protein 22%. Basal diet composition was presented in Table 1. Parameter observed were live body weight, carcass percentage, and abdominal fat percentage of broiler.

**Table 1:-** Basal Diet.

Ingredient	Composition (%)
Coconut meal	5.00
Soy bean meal	34.00
Corn	39.50
Rice bran	6.00
Fish meal	10.00
Premix	1.50
Coconut oil	3.00
Salt	1.00
<b>Amount</b>	<b>100.00</b>
Chemical composition	
ME (kcal/kg)	3131.07
Crude fat (%)	4.96
Crude protein (%)	22.06
Crude fiber (%)	5.11
Phosphor (%)	0.49
Calcium (%)	1.48

### Treatment and Data Recording

Data of live body weight, carcass percentage and abdominal fat percentage were conducted at 30 d age. At the end of experiment one bird was randomly selected from each replicate. The birds fasted, weighed individually to obtain of live body weight, slaughtered, scalded and eviscerated, then the carcass and abdominal fat weighed. The percentage of carcass determined of carcass weight divided by live body weight multiplied by 100%. The percentage of of abdominal fat determined of abdominal weight divided by live body weight multiplied by 100%.

### Statistical analysis

The study used a completely randomized design (CRD) with 6 treatments and 4 replications. The data analyzed by one-way analysis of variance (ANOVA) and followed by Duncan's multiple range test.

### Result:-

The average of live body weight, carcass percentage and abdominal fat percentage were presented in Table 2. The results of variance analysis showed that herbal drink significantly ( $p < 0.05$ ) increased live body weight, carcass percentage and decrease the abdominal fat percentage of broiler chickens.

**Table 2:-** Average of live body weight, carcass percentage and abdominal fat percentage of broiler.

Treatments	Parameters		
	Live body weight (g)	Carcass percentage (%)	Abdominal fat percentage (%)
T0	1315.00 <sup>b</sup>	65.25 <sup>b</sup>	4.13 <sup>a</sup>
T1	1335.00 <sup>ab</sup>	70.13 <sup>a</sup>	1.87 <sup>b</sup>
T2	1345.00 <sup>ab</sup>	70.35 <sup>a</sup>	1.71 <sup>bc</sup>
T3	1355.00 <sup>ab</sup>	70.48 <sup>a</sup>	1.66 <sup>bc</sup>
T4	1360.00 <sup>ab</sup>	70.50 <sup>a</sup>	1.57 <sup>c</sup>
T5	1367.50 <sup>a</sup>	71.00 <sup>a</sup>	1.53 <sup>c</sup>

Different superscript in the same column are significantly different ( $p < 0.05$ )

## Discussion:-

### Live Body Weight

Based on the research, live body weight of broiler chicken increases with supplementation of herbal drink at drinking water compare than without supplementation of herbal drink at drinking water. Similarly research by [11], supplementation of mixture herbal from fenugreek and curcumin significant ( $p < 0.05$ ) effect at live weight of broiler chicken. [12], reported that extractpolyherbal from of a mixture of nishyinda leaves, black pepper, and cinnamon was supplemented at drinking water highest of live weight of broiler chicken compare than control (without supplementation of polyherbal). [13], reported that supplementation of tulsi and neem at drinking water increases the live weight of broiler chicken.

The research showed that supplementation of herbal drink from mixture of extracts basil leaves, lime leaves and lemongrass leaves at drinking water significant effect ( $p < 0.05$ ) at live body weight of broiler chicken. The highest of live weight of broiler at T5 (1367.50 g) and the lowest at T0 (1315 g). This data inline with data of body weight gain and feed consumption also increases with supplementation of herbal drink [9]. Increasing of feed intake will improve the heavy of body weight and it will be affect on increases of live body weight. Bioactive compounds at phytobiotic will be an increase of intestinal morphology [14]. This increasing intestinal morphology will improve the enzyme digestive activity and increase the function of the gut [15]. [16], active compounds at *Pulicariagnaphalodes* powder stimulate the enzymes of oxidative to protect villi from oxidative damage. Herbal drink contain of bioactive compounds as antimicrobial and antioxidant function to improve the inhibition of pathogen bacteria in the gastrointestinal tract so increases the absorption of nutrient and it will be improved the growth of animal [5,16,17].

### Carcass Percentage

Supplementation of herbal drink from mixture of extract of basil leaves, lime leaves and lemongrass leaves had significant effect ( $p < 0.05$ ) on carcass percentage of broiler chicken. In line with data of live body weight was a significant effect by supplementation of herbal drinks. Bioactive compounds such as flavonoid and phenolic compounds at herbal drink increasing of intestinal health to promote the digestive enzyme to improve the better of digestion and absorption of nutrients especially protein [18,19,20]. Increases protein digestibility will be lead to the improvement of carcass weight. Bioactive compounds in herbal products have the ability to stimulate mucus into the intestine to prevent intestinal from the bacterial pathogen through damaging of bacterial membrane cell [21]. [22] reported that herbal extract increases of morphology mucosa intestinal and changes of microbial in the intestine, this was affect on the improve of the producing of lactic acid bacteria in the intestine and it will be inhibition the growth of pathogen bacterial such as *E. Coli*.

The research showed that carcass percentage of broiler chicken increases with supplementation of herbal drink compare than control. Based on Table 2 showed that the highest of carcass percentage achieved at T5 (71.00%), followed by T4 (70.50%), T3 (70.48%), T2 (70.35%), T1 (70.13%) and the lowest of carcass percentage was T0 (65.25%). Similarly research with [22], reported that carcass yield of broiler chicken also increase with supplementation of *Pulicaria gnaphalodes* powder 0.3%, AGP and probiotic. Contrast with our result, [4] showed that lemongrass oil did not affect of weight carcass cuts of broiler chicken. [23], also reported that supplementation of basil essential oil at broiler chicken did not effect on carcass yield.

### Abdominal Fat Percentage

The research showed that supplementation of herbal drink decreases ( $p < 0.05$ ) on percentage of fat abdominal of broiler chicken. This data line with data of cholesterol levels of broiler chicken [9]. [24] reported that the decreased triglycerides will be contribute to lowering of abdominal fat in broiler chicken. This research also line with [24], supplementation of basil essential oil significant effect decreases ( $p < 0.05$ ) on fat abdominal. [24], reported that fat abdominal of broiler chicken lower ( $p < 0.05$ ) compare than control affect by fermented Ginkgo biloba leaves. Contrary with [25] reported that dietary of oregano and garlic essential oils did not effect ( $p < 0.05$ ) on abdominal fat of broiler chicken.

Fat abdominal percentage decreases along with supplementation of herbal drink. The lower of abdominal percentage at T5 1.53%, followed T4 1.57%, T3 1.66%, T2 1.71%, T1 1.87% and the higher at T0 4.13%. Decreased of percentage of abdominal fat with treated of herbal drink derived from mixture of extract of basil, lime and lemongrass leaves in this research because flavonoid at herbal drink. Flavonoid had the function to inhibition of deposition adipose tissue by the transportation of fatty acid [26,27]. The low of abdominal fat at broiler influenced by the ability of flavonoid to reduce the fatty acid synthesis and inhibit of endogenous and exogenous cholesterol absorption [24,28,29]. Phenolic compounds contain in herbal drinks had antioxidant activity to protect damaged fatty acids from free radicals [30]. [31], the phenolic compound inhibits the hydrogen peroxide synthesis at the first step oxidation lipid through provide of hydrogen at the proxy radicals.

### Conclusion:-

The conclusion was herbal drinks increase the live body weight and carcass percentage and decrease the abdominal fat percentage of broiler chicken.

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### References:-

- [1] Sugiharto, S. 2016. Role of nutraceuticals in gut health and growth performance of poultry. J. Saudi Soc. Agric. Sci.; 61 (1): 65-75.
- [2] Pandey, A. K., P. Singh, N. N. Tripathi. 2014. Chemistry and Bioactivities of Essential Oils of Some Ocimum Species: An Overview. Asian Pac. J. Trop. Biomed.; 4(9): 682–94.
- [3] Kumar, A., Sukhla R., Singh P, Dubey NK. 2010. Chemical composition, antifungal and antiaflatoxicogenic activities of Ocimum santum essential oil and its safety assesment as plant based antimicrobial. Food. Chem. Toxicol.; 48:539-543.
- [4] Mukhtar, A.M., K.A. Mohamed, Amal, O.A, Ahlam, A.H. 2012. Effect of different levels of lemon grass oil (LGO) as natural growth promotor on the performance, carcass yields and serum chemistry of broiler chicks. Egypt. Poult. Sci.; 33 (1): (1-7).
- [5] Balakrishnan, B., S. Paramasivam, A. Arulkumar. 2014. Evaluation of the Lemongrass Plant (Cymbopogon Citratus) Extracted in Different Solvents for Antioxidant and Antibacterial Activity against Human Pathogens. Asian. Pac. J. Trop. Dis.; 4 (1): 134-139.
- [6] Tunjung, W. A. S., J. Cinatl, M. Michaelis, C. M. Smales. 2015. Anti-Cancer Effect of Kaffir Lime (Citrus Hystrix DC) Leaf Extract in Cervical Cancer and Neuroblastoma Cell Lines. Procedia Chemistry.; 14: 465-468.
- [7] Abirami, A., G. Nagarani, P. Siddhuraju. 2015. Hepatoprotective effect of leaf extracts from *Citrus hystrix* and *C. maxima* against paracetamol induced liver injury in rats. Food Science and Human Wellness.; 4. 35–41.
- [8] Nurbaya, S., E. Sitompul dan Suryanto. 2014. Ujiantibakteri dari ekstrak daun serehwangi, daun jeruk purut dan daun ruku-rukusertacampur dari ekstrak masing-masing daun. Prosiding Seminar Nasional Biologi Fakultas Matematika dan Ilmu Pengetahuan Alam, Sumatera Utara. (In Indonesian article).
- [9] Siregar, D.J.S., S. Setyaningrum, Sarim. 2015. Efektivitas minuman herbal terhadap pertumbuhan ayam broiler. Prosiding Seminar Hasil Penelitian. LP2M Universitas Muslim Nusantara (UMN) Al-Washliyah, Sumatera Utara. 178-187. (In Indonesian article).
- [10] Siregar, D.J.S. dan S. Setyaningrum. 2019. Effectively of herbal drinks on cholesterol and triglyceride level in blood of boiler. IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS); 12 (2): 35-48.
- [11] Abdel-Rahman, H.A., S.I. Fathallah, M.A. Helal, A.A. Nafeaa, I.S. Zahran. 2014. Effect of turmeric (*Curcuma Longa*), fenugreek (*Trigonella foenum-graecum L.*) and/or bioflavonoid supplementation to the broiler chicks

- diet and drinking water on the growth performance and intestinal morphometric parameters. *Global Veterinaria*; 12 (5): 627-635.
- [12] Molla, M. R., M. M. Rahman, F. Akter, M. Mostofa. 2012. Effects of Nishyinda, black pepper and cinnamon extract as growth promoter in broilers. *The Bangladesh Veterinarian*; 29 (2): 69 – 77.
- [13] Khatun, S., M. Mostofa, F. Alom, J. Uddin, M. N. Alam, N.F. Moitry. 2013. Efficiency of tulsi and neem leaves extract in broiler production. *Bangl. J. Vet. Med.*; 11 (1): 1- 5.
- [14] Jamroz, D., T. Wiertelcki, M. Houszka, C. Kamel. 2006. Influence of diet type on the inclusion of plant origin active substances on morphological and histochemical characteristics of the stomach and jejunum walls in chicken. *J. Anim Physiol. Anim. Nutr.*; 90: 255–268.
- [15] Jang, H. D., H. J. Kim, J. H. Cho, Y. J. Chen, J. S. Yoo, B. J. Min, J. C. Park, and I. H. Kim. 2007. Effect of dietary supplementation of fermented wild ginseng culture by-products on egg productivity, egg quality, blood characteristics and ginsenoside concentration of yolk in laying hens. *Kor. J. Poult. Sci.* 34:271–278.
- [16] Chowdhury, S., G. P. Mandal, A. K. Patra, P. Kumar, I. Samanta, S. Pradhan, A. K. Samanta. 2018. Different essential oils in diets of broiler chickens: 2. Gut microbes and morphology, immune response, and some blood profile and antioxidant enzymes. *Anim. Feed Sci. Technol.*; 236: 39–47.
- [17] Ambade, S. V., Bhadbhade, B. J. 2015. In-vitro comparison of antimicrobial activity of different extracts of *Cymbopogon citratus* on dental plaque isolates. *Int. J. Curr. Microbiol. Appl. Sci.*; 4:672-681.
- [18] Lee, K. W., Everts, H., Kappert, H. J., Frehner, M., Losa, R., Beynen, A.C. 2003. Effects of dietary essential oil components on growth performance, digestive enzymes and lipid metabolism in female broiler chickens, *Br. Poult. Sci.*; 44: 450–457.
- [19] Cross, D.E., R.M. McDevitt, K. Hillman, T. Acamovic. 2007. The effect of herbs and their associated essential oils on performance, dietary digestibility and gut micro flora in chickens from 7 to 28 days of age. *Br. Poult. Sci.*; 8:496-506.
- [20] Gandomi, H., S. Abbaszadeh, E. Rahimikia, N. Shariatifar. 2015. Volatile organic compound from *Pulicariagnaphalodes* and the antibacterial and antifungal properties of its essential oil and aqueous, ethanolic and methanolic extracts. *J. Food Process. Preserv.*; 39:2129–2134.
- [21] Zeng, Z., X. Xu, Q. Zhang, P. Li, P. Zhao, Q. Li, X. Piao. 2015. Effects of essential oil supplementation of a low-energy diet on performance, intestinal morphology and microflora, immune properties and antioxidant activities in weaned pigs. *Anim. Sci. J.*; 86:279–285.
- [22] Shirani, V., V. Jazi, M. Toghyani, A. Ashayerizadeh, F. Sharifi, R. Barekatin. 2019. *Pulicariagnaphalodes* powder in broiler diets: consequences for performance, gut health, antioxidant enzyme activity, and fatty acid profile. *Poult. Sci.*; 98:2577–2587.
- [23] Riyazi, S.R., Y. Ebrahimzadeh, S. A. Hosseini, A. Meimandipour, A. Ghorbani. 2015. Comparison of the effects of basil (*Ocimum basilicum*) essential oil, avilamycin and protexin on broiler performance, blood biochemistry and carcass characteristics. *Arch. Anim. Breed.*, 58: 425–432.
- [24] Cao, F.L., X. H. Zhang, W. W. Yu, L. G. Zhao, T. Wang. 2012. Effect of feeding fermented Ginkgo biloba leaves on growth performance, meat quality, and lipid metabolism in broilers. *Poult. Sci.*; 91:1210–1221.
- [25] Kirkpinar, F., H.B. Ünlü, M. Serdaroglu, G.Y. Tur. 2014. Effects of dietary oregano and garlic essential oils on carcass characteristics, meat composition, colour, pH and sensory quality of broiler meat. *Br. Poult. Sci.* 55 (2): 157–166.
- [26] Honda, K., H. Kamisoyama, Y. Tominaga, S. Yokota, S. Hasegawa. 2009. The molecular mechanism underlying the reduction in abdominal fat accumulation by licorice flavonoid oil in high fat diet-induced obese rats. *Anim. Sci. J.*; 80:562–569.
- [27] Altop, A., G. Erener, M. E. Duru, K. Isik. 2018. Effects of essential oils from *Liquidambar orientalis* Mill. leaves on growth performance, carcass and some organ traits, some blood metabolites and intestinal microbiota in broilers. *Br. Poult. Sci.* 59:121–127.
- [28] Aoki, F., S. Honda, H. Kishida, M. Kitano, N. Arai, H. Tanaka, S. Yokota, K. Nakagawa, T. Asakura, Y. Nakai, T. Mae. 2007. Suppression by licorice flavonoids of abdominal fat accumulation and body weight gain in high-fat diet-induced obese C57BL/6J mice. *Biosci. Biotechnol. Biochem.* 71:206–214.
- [29] Rao, A. V., and D. M. Gurfinkel. 2000. The bioactivity of saponins: Triterpenoid and steroidal glycosides. *Drug Metabol. Drug Interact.* 17:211–235.
- [30] Khanahmadi, M., and K. Janfeshan. 2006. Study of antioxidant property of *Ferulago angulata* plant. *Asian J. Plant Sci.*; 5:521– 526.
- [31] Brenes, A., Roura, E. 2010. Essential oil in poultry nutrition: main effect and modes of action. *Anim. Feed Sci. Technol.*; 158: 1–14.