Revista Brasileira de Higiene e Sanidade Animal
Brazilian Journal of Hygiene and Animal Sanity
ISSN: 1981-2965

Artigo

Evaluation of different levels of Malva sylvestris supplementation powder on performance, blood biochemical and intestinal microbial population in male Cobb 500 broiler chicks

Avaliação de diferentes níveis de pó de suplementação de Malva sylvestris no desempenho, bioquímica sanguínea e população microbiana intestinal em frangos de corte machos Cobb 500

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Abstract: The aim of this study was to determine the effect of using different levels of Malva powder on performance, some blood biochemical and intestinal microbial population in male Cobb 500 broiler chicks. For this reason, the four hundred one-days-old Cobb 500 strain broiler chicks were divided as an experimental randomized design plan into the four treatments with 5 replicates and 20 chicks each. The treatments were basal diet basis corn and soybean meal with no Malva powder supplementation kept as control, and 250, 500 and 700 g of Malva powder per each 1000 kg of diets respectively. During the study, the live body weight gains, feed intake and feed conversion ratio of birds were calculated weekly. At the end of the trial (6 weeks) four male bird's form each replicates were slaughtered and dressing percentage were calculated. In addition, some blood biochemical assays and intestinal microbial population detection were evaluated. Data indicated that using of Malva powder increased feed intake, body weight gain and Pre-slaughter weight compared to the control. There significant differences ($p \leq 0.05$) for carcass traits among treatments. Data from this study showed that triglyceride, cholesterol, glucose and LDL decreased in groups fed by Malva powder ($p \leq 0.05$) supplementation. Eschechia-Coli, Klebsiella were decreased and Lactobacillus bacteria colonies were increased significantly instead ($p \leq 0.05$). In conclusion, Malva, powder supplementation may improve the performance, some carcass traits and some blood biochemical of Cobb 500 broilers chicks.

Key words: Broiler chicks, Performance, Blood biochemical, Malva powder, Intestinal microbial population.

Resumo: O objetivo deste estudo foi determinar o efeito do uso de diferentes níveis de pó de Malva sobre o desempenho, bioquímica sanguínea e a população microbiana intestinal em frangos de corte machos Cobb 500. Por esse motivo, os quatrocentos pintos de corte da linhagem Cobb 500 com um dia de idade foram divididos em um plano de delineamento experimental ao acaso em quatro tratamentos com 5 repetições e 20 pintos cada. Os tratamentos foram dieta basal à base de milho e farelo de soja sem suplementação com pó de Malva mantida como controle, e 250, 500 e 700 g de pó de Malva para cada 1000 kg de ração, respectivamente. Durante o estudo, os ganhos de peso vivo, o consumo de ração e a taxa de conversão alimentar das aves foram calculados semanalmente. No final do ensaio (6 semanas), cada uma das réplicas de quatro aves machos foram abatidas e a porcentagem de cobertura foi calculada. Além disso, alguns ensaios bioquímicos sanguíneos e detecção de população microbiana intestinal foram avaliados. Os dados indicaram que o uso de pó de Malva aumentou o consumo de ração, o ganho de peso corporal e o peso pré-abate em comparação com o controle. Houve diferenças significativas ($p \leq 0,05$) para características de carcaça entre os tratamentos. Os dados deste estudo mostraram que triglicérides,

colesterol, glicose e LDL diminuíram nos grupos alimentados com a suplementação de pó de Malva ($p \leq 0,05$). Eschechia-Coli, Klebsiella diminuíram e as colônias de bactérias Lactobacillus aumentaram significativamente ($p \leq 0,05$). Em conclusão, Malva, a suplementação em pó pode melhorar o desempenho, algumas características de carcaça e alguma bioquímica sanguínea de pintos de corte Cobb 500.

Palavras-chave: Frangos de corte, Desempenho, Bioquímica do sangue, Pó de Malva, População microbiana intestinal.

http://dx.doi.org/10.5935/1981-2965.20210032
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Recebido em 16.09.2021. Aceito em 30.12.2021
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Introduction

In recent years, the consumption of poultry meat has become popular and there has been special attention paid on rearing broiler chicks (KHEIRI et al., 2015). Animal nutritionist and feed experts who have focused application of feed additives in poultry diet in or der to boost nutritional efficiency (RAHIMIAN et al., 2017, SANTOS et al., 2009). Antibiotics are some feed additives that used in broiler diets to improvise the performance in broiler chicks (CYBERHORSE, 1999). Regarding the fact that certain antibiotics consumed in broiler diet are also applied in human illnesses, it becomes possible to create antibiotic-resistant bacterial strains through consumption of antibiotic residues found in poultry products leading to ineffectiveness of medical antibiotics in humans (JAMROZ, 1989; BURGER AND WACHTER, 1998). Therefore, the residual of antibiotics in poultry meat and their other product have been over-shadowed the consumption of them in broiler chicken diets (HERANDEZ et al., 2004). Incorporation of diet with herbs or their active ingredients for growth stimulation, higher safety and resistance against poultry-related diseases

has been examined. Herbal components such as phenols, terpenoids and essential volatile oil and extracts have antibacterial and antioxidant properties and they may improve digestion, lower blood lipids and cholesterol and ultimately improve poultry growth (CUTILLO et al., 2006; YAZDANPARAST and ALAVI, 2001). Malva has a variety of medical effects such as anti-inflammatory properties. It is applied in treatment of dry coughs and as protective layer on inflamed mucous membranes (ZARGARI, 2001; AMIT ROMACH, 2004, OLIVEIRA, et al., 2012). It has also more than 10 percentage of mucilage hydrolyzed into galactose,

aracinoz, glucose, rhamnosus and contains certain amount of tanons and leuco-antho-cyanin and antho-cyanin plus several mono, di and tetra-trepnoids (RAZAVI et al., 2011). It seems that the use of natural and herbal combinations for reducing antibiotic effects is crucial in production of broiler chickens (STURKIE, 1995; REZAIAN, 2006). Hence, the aim of this study was conducted to determine the effect of using different levels of Malva sylvestris powder supplementation on performance, some blood biochemical and intestinal microbial population in Cobb 500 broiler chicks.

Materials and Methods

Total of four hundred one-day-old, Cobb 500 broiler chicks with an average weight of 40 ± 5 g were divided into four

The live body weight gains, feed intake and feed conversion ratio were calculated weekly. At the end of experimental period (6 weeks), five chicks form each replicates were slaughtered by cervical dislocation method and then dressing and the internal organs were removed after slaughter and some visceral organ percentage were calculated Table 1.

Blood samples were taken and commercial Pars Azmoon Kits analyzed galacturonic acid. Moreover, Malva treatments and were further subdivided into five replicates with 20 birds each. Malva areal part was gathered from local places in Shahre-Kord, Iran and it was grounded to make a fine powder. The soybean meal and corn grains were analyzed in the lab for determine of dry matter, crude protein, calcium, phosphorus and theirs crude fiber with Association of Official Analytical Chemists (AOAC, 2000) method.

The basal diet was balanced based on corn and soybean meal recommended by National Research Council (NRC, 1994) instruction as control diets and treatments were as basal diet with 250, 500 and 750 g per each 1000 g of diets respectively.

During the experiment period, diets and fresh water were provided adlibitum. some bloods chemical. To determine the microbial count, about 5 cm from the length of the ileum was sampled to determine the microbial population. In addition, 1 g of ileum content was used to make 10-fold dilution using buffered peptone water and then 0.1 mL of the appropriate ileum dilution was spread on Lactobacillus MRS1 Agar-Hi Media Laboratories to detect lactic acid bacteria and Violet Red Bile Agar to detect Eschechia-Coli, Klebsiella and Lactobacillus bacteria colonies form. The

plates were incubated at 37.5 $^{\circ C}$ for 48 h. After counting the number of colonies in each plate, the number so obtained was multiplied by inverse of the dilution and the result was stated as the number of colony forming unit (CFU) in 1 g of the sample described by (KHEIRI et al., 2015).

Table1 – Composition of the experimental diets

Ingredients %	**0-2 (weeks)**	**3-4 (weeks)**	**4-6 (weeks)**
Corn	54.7	59.4	65
Soybean	39.7	35.5	30
Vegetable -Oil	1.45	1.50	1.70
DCP	1.70	1.45	1.30
Oyster shell powder	1.05	0.95	0.86
Methionine D-L	0.310	0.250	0.230
Lysine -L	0.22	0.10	0.10
Edible Nacl	0.3	0.3	0.25
Mineral and Vitamin Premix*	0.50	0.50	0.50
Threonine -L	0.09	0.04	0.04
Calculated nutrient content			
ME(Kcal per Kg)	2850	2900	2950
CP (%)	21.8	20.4	18.4
Ca (%)	0.91	0.82	0.74
Available Phosphorus (%)	0.46	0.41	0.37
Lysine (%)	0.180	0.120	0.130
Methionine+Cystine (%)	0.92	0.84	0.75

*Supplied per each kilogram of chicks diet : 7.500 IU of vitamin A, 2000IU vitamin D3, 30 Mg vitamin E,1.5 µg vitamin B12,2Mg B6,5 Mg. Vitamin K,5 Mg vitamin B2,1 Mg vitamin B1,40 Mg nicotinic acide,160µg vitamin Biothine,12 Mg Calcium pantothenate,1Mg Folic acid 20 Mg Fe,71 Mg Mn,100µg Se,37Mg Zn,6 Mg Cu,1.14 Mg I,400 µg Cu.

Obtained data were analyzed statistically by one-way ANOVA method using SAS 9.1(2001) software and Duncan's (1995) multiple range tests was used to

detect the differences (P≤0.05) among different treatments means.

Result and Discussion

The effects of Malva powder supplementation on feed intake, weight gain and feed conversion ratio on broilers are presented in Table 2. As result revealed that use of different levels of Malva, powder had increased feed intake (FI) significantly (p≤0.05) and the body weight gain BWG was higher significantly. Additionally, feed conversion ratio (FCR) was at the lowest in 700 g Malva powder group compared to the control (p≤0.05). The result showed that the usage of Malva powder was significant influences pre-slaughter weight and carcass yield percentage. The results of (Kiani et al., 2015) study indicated that Malva leaves insignificant effect on weekly feed intake and weight gain and the conversion ratio is little (P≤0.05). Although they were noted that increased feed intake in the fourth and sixth weeks was significant, the weight gain and conversion ratio were insignificant**.**

Table 2 – The effect of experimental diets on broilers performance

Treatments	FI(g.d)	BWG(g.d)	FCR	Pre-slaughter weight (g)	Carcass (%)
Control	97.8^{b}	48.2^{b*}	1.97^{b}	2315.2^{b}	69.8
250 g Malva powder	99.1^{b}	49.5^{ab}	1.95^{ab}	2358.5^{ab}	70.8
500g Malva powder	101.6^{a}	49.8^{ab}	1.90^{ab}	2342.7^{ab}	71.2
700g Malva powder	102.6^{a}	50.2^{a}	1.90^{ab}	2395.5^{a}	72.15
SEM	2.55	1.52	0.50	62.51	2.56
P-Value	**	**	**	**	n.s

*Means within columns with no common on letter are significantly different (p≤ 0.05).

In (Kiani et al., 2015) study, the sixth treatment received the highest intake with 400 mg of Malva at the third week, but it showed no significant difference from the other experimental treatments (P≤0.05). At the 4 week, the sixth treatment received the highest feed intake with 400 mg per kg, which made a significant difference together with the control treatment (P≤0.05). In their study, the largest feed conversion ratio was observed in the sixth treatment with 400 mg per kg of Malva as well as the control treatment, Table 3.

Table 3 – The effect of experimental diets on some visceral organs percentage

Treatments	Intestine	Liver	Gizzard	Abdominal Fat
Control	5.05^{c}	2.05	1.49^{b}	3.52^{a}
250 g Malva powder	5.17^{bc}	2.14	1.54^{ab}	3.28^{b}
500 g Malva powder	5.41^{b}	2.18	1.63^{a}	3.16^{c}
700 g Malva powder	5.59^{a}	2.25	1.66^{a}	2.92^{d}
SEM	0.42	0.28	0.092	0.16
P-Value	**	**	**	**

*Means within columns with no common on letter are significantly different (p≤ 0.05).

Data from this study showed that there were significant differences between treatments about visceral organs percentage except liver. Nobakht et al (2010) showed that thehighest percent of carcass was observed in experimental group but the lowest percent of it observed in control group. The results of (Kiani et al., 2015) suggested that there was no significant difference at the 42 days of age between the live weight and other body organs of experimental treatments.

They also mentioned that there was no significant difference between the mean of spleen weight in the experimental treatments. They noted that the mean of gizzard weight showed no significant difference between the experimental treatments.

Javed et al (2006) suggested that there is a possibility of gathering these to antimicrobial herbs made a remarkable decrease in the intestine microbial colony and this prevented from lyses of amino acids and they may use in formation of protein issues and increased the breast percentage.

Some researcher showed that, Malva has stimulatory effects on pancreatic secretions by increasing the

secretions of digestive enzymes more amounts of nutrients as if amino acids can be digested and absorbed from the digestive tract and thereby improve carcass traits. The increasing the percents of gizzard and liver by positive effects via physically grinding and increasing bile secretion on nutrient digestion.

With increased amounts of absorbed amino acids, organs like breast and thigh drawn more growth. Data from Table 4 illustrated that the serum blood triglyceride, cholesterol, glucose and LDL were decreased and HDL increased significantly instead ($p \leq 0.05$).

Table 4 – The effect of experimental diets on some blood biochemical

Treatments	Triglyceride (mg.dl)	Cholesterol (mg.dl)	HDL (mg.dl)	LDL (mg.dl)	Glucose (mg.dl)
Control	71.29[a]	132.11[a]	69.20[c]	70.15[a]	148.18[b]
250 g Malva powder	69.14[b]	131.24[b]	71.20[b]	68.54[b]	150.35[ab]
500 g Malva powder	67.21[b]	130.16[b]	72.01[a]	65.26[b]	152.20[a]
700 g Malva powder	64.01[c]	129.14[c]	73.15[a]	64.25[c]	154.14[a]
SEM	1.28	2.16	0.95	1.60	3.22
P-Value	**	**	**	**	**

*Means within columns with no common on letter are significantly different ($p \leq 0.05$).

Nobakht et al (2010) mentioned that the experimental groups had significantly difference in blood glucose level ($P \leq 0.05$). The Lowest level of blood serum glucose (147.83) mg.dl was observed in the chicks were fed byMalva and the highest level of that (183.5) mg.dl was related to the control group. Hosseini Mansoub (2011) showed that the serum total cholesterol, Triglycerides and LDL concentration were significantly reduced in-group of Malva extract compared to the control group ($P \leq 0.05$) Table 5.

Also the concentration of serum HDL and were not significantly reduced in groups compared to the control groups. According to (Lee, 2003), high level of

fibers can increase the excretion of bile and this can decrease the blood cholesterol level.

Table 5– The effect of experimental diets on Escherichia-Coli and Klebsiella and Lactobacillus bacteria colonies (CFU)

Treatments	Escherichia-Coli	Klebsiella	Lactobacillus
Control	5.45[a]	4.52[a]	4.10[b]
250 g Malva powder	4.96[a]	3.84[ba]	4.99[ab]
500 g Malva powder	4.54[ab]	3.56[ab]	5.06[a]
700 g Malva powder	4.05[b]	3.49[b]	5.28[a]
SEM	0.41	0.55	0.65
P-Value	**	**	**

*Means within columns with no common on letter are significantly different ($p \leq 0.05$).

The beneficial effects of herbal plants or their active substances may include the stimulation of appetite and increase feed intake, the improvement of endogenous digestive enzyme secretion, activation of immune response and antibacterial, and antioxidant activities (KHEIRI et al., 2015).

According to the results obtained by (Jafari et al., 2011) carried out on various levels of Malva extract and great burdock at 200 ppm in the fourth group, which was a mixture of the two extracts, the highest separated weight belonged to the great burdock, while the weight of Malva group was greater than that of the control. Considering the presence of natural anti-inflammatory and anti-septic materials such as tannins, anthocyanins, flavonoids and loco-anthocyanins found in Malva, the increased level ofabsorption was significant.

Kiani et al (2015) demonstrated that in morphological terms, however, the villi colon length and crypt depth showed a significant difference at day 42. It can be inferred from those experiment that Malva at 400 mg leaves an effect, thus leading to improved intestinal villi length and crypt depth, and ultimately greater absorption brought about by Malva's anti-inflammatory and anti-microbial properties.

The presence of harmful bacteriapopulations in the gastrointestinal tract may cause breakdown of amino acids and thereby reduce their absorption, some chemical compounds are present in Malva

as antimicrobial substances may reduce the harmful bacteria populations' colonies in the gastrointestinal tract and improve the levels of absorbed amino acids. Lee et al (2003) found that the existence of harmful microbes in digestive system causes an increase protein and amino acids lysis of nutrients, di-amination activity of proteins and amino acids and rapid decomposition of these molecules due to secretary substances from bacteria like urease. Since Malva have high level of fibers so this can one of other influences of carvacrol is on immune system, it can improve immune system of chickens. The rate of heterophile to lymphocyte is an important index in evaluating immune system, the higher rate of this ratio shows that immune system has been weakened and an increase in the body inflammation (STURKIE, 1995).

Conclusions

In conclusion, we could explain that Malva powder had beneficial acts on performance, carcass traits, some blood biochemical and intestinal flora in Cobb 500 broilers chicks. Malva has anti-inflammatory, astringent, laxative properties and was once applied in Native American traditional medicine for healing wounds, types of arthritis and fractures and painful swelling of the stomach as well as treating dry coughs.

This improvement may be due to the biological function Softhis herbal to improve growth or that may be due to its role as stimulant, carminative, enhanced digestibility antimicrobial properties. However further studies are needed for more explanations.

Acknowledgments

We are thankful to Agricultural and Veterinary staff of Islamic Azad University, Shahre-Kord Branch, for the cooperation and assistance us in order to run this test.

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