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Effect of Dietary Dried Silage of Rumen Contents on Productive and Immunological Performance of Broiler Chicks

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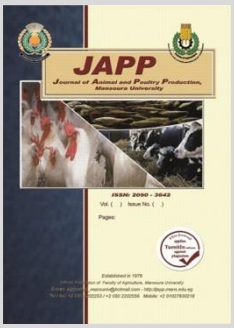

ABSTRACT

A trial was carried out to evaluate the effect of dried silage of rumen content (DSRC) and acidifiers on the growth performance of broiler chickens. A total of three hundred and twenty unsexed one day old broiler chicks (Cobb 500) were used. The birds were distributed randomly to eight experimental treatments (40 birds/treatment) with four replicates (10 birds/replicate) in a completely randomized design. The experimental diets for treatments were containing dried silage of rumen content at levels of 0, 5, 7.5 and 10% without or with 0.5g acidifiers/kg diets. The feeding trial lasted for six weeks. The obtained results showed that increasing dietary dried silage of rumen content up to 10% and 0.5g acidifier/kg diet increased significantly marketing weight of chicks, total weight gain, total feed intake and improved feed conversion ratio. Carcass traits and blood parameters were not affected by dietary dried silage of rumen content or acidifiers except HDL which was increased in blood of chicks fed diets containing 5% dried silage of rumen content. From the economic of view, it can be concluded that inclusion dried silage of cow rumen content up to 10% of the diets improve broiler performance and had no adversely effect on carcass traits, immunity or blood parameters. Also, adding acidifiers at a level of 0.5g/kg diet can be improving broiler performance.

Keywords: Rumen content, acidifiers, broiler chicks.

INTRODUCTION

There is a problem in developing countries, including Egypt. The demand for animal protein has increased as a result of growing population,. Broiler production represents one of the most economic factor and easiest means to supply demand gap of animal protein, due to their rapid growth rate and superior feed conversion ratio. Meanwhile, feed cost is a major obstacle to poultry production in Egypt. Feed alone accounts for up to 75% of total cost of broiler production (Ubosi, 2000). Efforts to reduce the high cost of feeds and therefore the cost of poultry products have concentrated on the use of cheaper and locally available alternative agro-by products especially those that have no nutritional value to mankind (Onu, 2007, Okonkwo *et al.*, 2008, Oladunjoye and Ojebiyi, 2010). including slaughterhouse by-products (Rumen content) after processing and adding some materials such as wheat bran ,A liquid containing lactic acid-producing bacteria ,A liquid containing natural instant yeasts ,Liquid carbohydrates (molasses) ,Vitamins and minerals. Incorporation of such products in poultry feed could be incorporated to replace reasonable proportion of the conventional energy and protein ingredients and reduce feed cost. Rumen content contains the end products of microbial metabolic activities such as microbial protein, amino acids, vitamins, volatile fatty acids (VFA) and contains no anti-nutritional factors (Okpanachi *et al.*, 2010). Rumen content contains microbial protein and high content of methionine and lysine. The content of rumen is an important source of vitamins especially B-complex vitamins and carbohydrates (Esonu *et al.*, 2006). Rumen content improving feed digestion, improving immunity against diseases, increase growth and egg production in poultry, Low mortality rate, increase the intake of dry matter, and it saves production costs and thus lowers product prices (Esonu *et al.*, 2006).

Acidifier substances are one of the most important feed additives that improve the nutritional values of broiler diets. Organic acids: any organic carboxylic acid is considered, including fatty acids and amino acids R-COOH. They are either simple monocarboxylic acids such as formic, acetic, propionic, butyric acids, or they are carboxylic acids with a hydroxyl group (usually on alpha carbon) as lactic, malic, tartaric and citric acids. Organic acids are presently added to chicken diets to increase feed utilization, improve growth rate, reduce intestinal microflora (Roth and Kirchgessner, 1998), and maintaining the pH of digesta at a level preventing the growth of pathogenic bacteria. They also show bactericidal activity against pathogenic intestinal microflora. (García *et al.*, 2007; Paul *et al.*, 2007; Mikulski *et al.*, 2008). Therefore, it improves the immunity of chickens against diseases.

Therefore, the present study was planned to study the effect of different levels of dried silage of cow rumen content without or with acidifiers on broiler performance, carcass characteristic, blood parameters and economic of production.

MATERIALS AND METHODS

This experiment was conducted during the period of December (2020) and January (2021) in the Poultry Research Unit, Faculty of Agriculture Mansoura University.

Rumen content collection and processing

Cattle rumen digesta were collected from El-Mansoura abattoir. After slaughtering, the rumen of each animal was split opened with aid of sharp butcher's knife .The contents of the fresh rumen were unloaded on a clean plastic table (1) cloth, then ingredients that help speed up fermentation were placed, including: A liquid containing lactic acid-producing bacteria, natural dried yeast (*saccharomyces cerevisiae*), carbohydrates (molasses), Vitamins and minerals. Wheat bran was used in an amount that allows adjusting the

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moisture content in the range of 65%, and then manual mixing several times .The mixture is packed in plastic containers with a press. Close the packages and not allow air to enter. The packages put in a dry place away from sunlight and moisture. A small package of 2 kg was made using the same steps. Three weeks later, it was opened and a sample was taken to measure the PH. After reaching the pH in the range of 3.6 degrees, the packages were emptied onto plastic sheets and spread out to dry in the sun with daily stirring 4-5 times a day for faster dry. The dry ingredients were ground and sifted to remove impurities, and then placed in clean, tightly closed plastic containers until experiments were conducted. Sun drying was used to save the value the crude protein of rumen content. Goodrich and Meiske (1969) used a forced air oven to dry rumen contents and found that beside its high economical costs, drying temperature had adversely affected the feeding value of the crude protein component. Sun drying is an excellent approach for tackling this problem (Abdelmawla, 1990 and Khattab *et al.*, 1996).

Table 1. Composition of the experimental diets

Ingredients (%)	Starter diets (0-4 weeks of age)				Grower diet (4-6 weeks of age)
	Diet1 0% DSRC (control)	Diet (2) 5% DSRC	Diet (3) 7.5% DSRC	Diet (4) 10% DSRC	
Yellow corn	60.6	57.1	55.0	53.0	67.6
Soybean meal 44% CP	22.1	20.0	19.6	19.1	17.8
Corn Gluten 62% CP	12.5	13.0	13.0	13.0	10.0
DSRC*	0.0	5	7.5	10	0.0
Di calcium Phosphate	1.8	1.8	1.8	1.8	1.8
Limestone	2.0	2.0	2.0	2.0	1.8
Premix**	0.3	0.3	0.3	0.3	0.3
Salt	0.3	0.3	0.3	0.3	0.3
Lysine HCl	0.3	0.4	0.4	0.4	0.3
Methionine	0.1	0.1	0.1	0.1	0.1
Total	100	100	100	100	100
Calculated analyses as fed basis (NRC,1994)					
ME, Kcal/kg	3002	3007	3001	2996	3048
Crude protein, %	22.96	22.9	22.92	22.90	20.11
Crude fiber, %	3.04	3.68	4.03	4.38	2.86
Ether extract,%	2.79	3.6	3.18	3.30	2.96
Lysine, %	1.11	1.13	1.12	1.10	0.99
Methionine, %	0.53	0.53	0.53	0.53	0.48
Meth +Cyst,%	0.92	0.92	0.92	0.92	0.83
Total phosphorus, %	0.71	0.69	0.68	0.67	0.69
Av. phosphorus, %	0.46	0.45	0.45	0.45	0.45
Calcium, %	1.22	1.21	1.21	1.20	1.12

Acidifiers (0.5g/kg diet) was added instead the same weight of corn in the diets.

***: DSRC = Dried silage of rumen content.**

****: Each 3 kg premix contains: Vit. A, 12,000,000 IU; Vit. D_3, 2,500,000 IU; Vit. E, 10 g; Vit. K, 2.5 g; Vit. B_2, 5 g; Vit. B_6, 1.5 g; Vit. B_{12}, 10 mg; Biotin, 50 mg; Folic acid, 1.0 g; Nicotinic acid, 30 g; Pantothenic acid, 10 g; Antioxidant, 10 g; Mn, 60 g; Cu, 10 g; Zn, 55 g; Fe, 35 g; I, 1.0 g; Co, 250 mg and Se, 150 mg.**

Housing and Management

Three hundred and twenty unsexed one day old broiler chicks (Cobb 500) were distributed randomly to eight experimental treatments (40birds/treatment) with four replicates (10birds/replicate) in a completely randomized design. The initial weight of chicks was 44±0.2g. The birds reared in cages and received water and feeds *ad-libitum* during the experimental period (6 weeks of age). The light program was 24h in the first day then maintained 23 hours until the end of the experiment (6 weeks of age).

Experimental Diets

Experimental diets were formulated according to nutrient specifications of the standards published by National Research Council (NRC, 1994). In factorial design (4*2) eight treatment diets containing four levels of dried rumen contents (0 %, 5 %,7.5% and 10%) without or with acidifiers (0.5g/kg diet). The birds received the experimental starter diets form 0 to 4 weeks of age then received the grower diets up to 6 weeks of age without rumen content or acidifiers.

Experimental criteria

Chicks were weighed on the first day of the experimental feeding as initial weight, and then weekly weighting was systematic until the end of the experiment. Body weight gain, feed intake and feed conversion ratio (FCR) were calculated weekly. One-day-old chicks were received vitamin AD_3E at a rate of 1 ml/liter of drinking water for two days and minerals at a rate of 5ml/liter of drinking water for two days.

At the end of study (6 weeks of age), five blood samples per treatment were collected from the slaughtered birds in clean non-heparinized test tubes. Sera were separated by centrifugation at 3000 rpm for 10 minutes and stored at -20 ^{0}C until analysis. Blood serum concentrations of total protein (TP) (Doumas *et al.*, 1981), albumin (Alb) (Doumas *et al.*, 1971), globulin (Glo), total lipids (TL) (Frings and Dunn, 1970), triglycerides (Tri) (Fossati and Prencipe, 1982), total cholesterol (TC) (Allain *et al.*, 1974), high density lipoprotein cholesterol (HDL-C) (Myers *et al.*,1994) low-density lipoprotein cholesterol (LDL-C) (Myers *et al.*,1994), immunoglobulins (IgA, IgG and IgM), total antioxidant capacity (TAC), malondialdehyde (MDA) (Mihara and Uchiyama, 1978) and thyroid hormones (thyroxin and triiodothyronine) were determined (Britton *et al.*,1975 and Houston and O'Neill, 1991). Activity of alanine aminotransferase (ALT) and aspartate aminotransferase (AST) (Reitman and Frankle, 1957) and superoxide dismutase (SOD) were also measured in blood serum (Wheeler *et al.*, 1990). All blood serum parameters (except hormones) were determined by commercial kits obtained from spectrum diagnostic kits, spect. Corp. Biotech. S.A.E., Egypt.

Carcass Characteristics

The feeding trail lasted for sex weeks. At the end of the experimental period, eight birds from each treatment (2birds/replicate) were selected randomly. They were leg-banded, weighed individually and slaughtered. Carcass weight and some internal organs were determined as weight and percent of pre-slaughter weight.

Statistical analysis

Results were statistically processed using the Statistical Analysis System's two-way analysis of variance of the GLM technique (SAS, 2004). Tukey's Multiple Range-test ($P<0.05$) was used to distinguish between the treatment means that differed significantly from one another. The following statistical model was used: $Yij = \mu + Fi + Aj + FAij + eij$. Where: Yij = observed traits; μ = the overall mean; Fi = effect of dried silage of rumen content; i= (0, 5, 7.5 and 10%); Aj = effect of acidifiers; j = (0 and 0.5g/kg diet); eij = effect of interaction between dried silage of rumen content and acidifiers; eij = experimental random error.

RESULTS AND DISCUSSION

Effect of dietary dried silage of rumen content on broiler performance:

Data of performance are present in Table (2). Initial live body weight (LBW) of chicks ranged from 44.0 to 45.0 g with no significant differences ($p>0.05$) among different experimental groups. Feeding on silage of rumen content (DSRC) had been affected significantly on final body weights, weight gain, feed intake and feed conversion ratio during the experimental period. Increasing levels of silage of rumen content up to 10% of the diets led to increase the final body weight, weight gain and feed intake of broiler chicks and improved feed conversion ratio. The best experimental group in marketing weight and feed conversion ratio was that fed diets containing 10% DSRC. Adding acidifiers to the experimental diets (0.5g/kg) led to increase final body weight, total weight gain and feed intake of broiler chicks and improve feed conversion ratio during the experimental period. The interaction between silage of rumen content and acidifiers was not affected on broiler performance (Table2). This improvement in broiler performance could be attributed to higher protein component (microbial protein), long change fatty acids and partially digested feed protein.

Table 2. Performance of broiler chicks fed different levels of dried silage of rumen content and acidifiers:

Treatments	Initial weight, kg	Final weight, kg	TBWG, kg	T FI, kg	TFCR
Dried silage of rumen content (A)					
Control 0% DSRC (A1)	0.044	2.505^{d}	2.461^{d}	4.460^{c}	1.812^{a}
DSRC 5% (A2)	0.045	2.687^{c}	2.642^{c}	4.670^{b}	1.768^{b}
DSRC 7.5% (A3)	0.044	2.919^{b}	2.875^{b}	4.904^{a}	1.706^{c}
DSRC 10% (A4)	0.044	3.033^{a}	2.989^{a}	4.939^{a}	1.653^{d}
SEM	0.0002	0.0262	0.0262	0.0511	0.0101
Significance level	NS	**	**	**	**
Acidifiers					
Acidifiers (B1) 0.0 g/kg diet	0.044	2.715^{b}	2.671^{b}	4.655^{b}	1.746^{a}
Acidifiers (B2) 0.5g/kg diet	0.044	2.857^{a}	2.812^{a}	4.831^{a}	1.723^{b}
SEM	0.0001	0.0185	0.0186	0.0361	0.0071
Significance level	NS	**	**	**	**
AB Interaction					
A1*B1	0.044	2.417	2.373	4.293	1.809
A1*B2	0.044	2.594	2.550	4.626	1.815
A2*B1	0.045	2.651	2.607	4.620	1.772
A2*B2	0.045	2.722	2.678	4.720	1.763
A3*B1	0.045	2.836	2.792	4.821	1.727
A3*B2	0.044	3.003	2.959	4.987	1.686
A4*B1	0.044	2.958	2.914	4.887	1.677
A4*B2	0.044	3.108	3.064	4.992	1.629
SEM	0.0003	0.0370	0.0371	0.0722	0.0143
Significance level	NS	NS	NS	NS	NS

Means within the same column having different superscripts significantly different at (p≤0.05). SEM: Standard error of the means.
NS: Not significant. **: Significant at p≤0.01

Our results agree with that of Okorie (2005) and Elfaki and Abdelatti (2015) who indicated that birds fed the dried rumen content diets performed generally better than the control group. Performance improvement could also probably be due to adequate dietary crude fiber level. Crude fiber activates the intestine and more occurrence of peristaltic movement, more enzyme production resulting in efficient digestion of nutrients (Esonu *et al.,* 2004). Gebrehawariat *et al.* (2016) who found there were positive responses in the weight gain and final weight of hens up to 10% level of dried rumen content inclusion. Our results are in line with that reported by previous studies (Emmanuel, 1978; El-Shaarrawi *et al.,* 1988; Das *et al.,* 1997; Adeniji and Balogun, 2001 and 2002; Esonu *et al.,* 2006 and 2007 and Adeniji, 2008) who reported that, broilers fed diets containing dried rumen content recorded higher body weight and feed conversion than the control birds during the experimental period.

These results agree with Esonu *et al.,* (2006); Abd-ELGalil and khider (2001). The increased in feed intake of the birds fed diets containing dried rumen content may be due to this diets contain high fiber content which, increase feed intake. This result agrees with reports of Esonu *et al.,* (2007). The variation noticed in the feed intake of birds across the dietary groups may be attributed to the difference in the levels of fiber content of the diets (Makinde *et al.,* 2014). They authors also observed that feed intake of birds increased with increased levels of fiber in the diet because the birds eat to meet their energy requirement. Also, Abdullahi and Mohammed (2017) and Makinde *et al.* (2008) observed significant differences in feed conversion ratio of broiler chickens fed sun dried rumen content. Onu *et al,* (2011): Adeniji and Balogun (2002) and. Odunsi (2003) noticed a significant improvement in FCR of birds as the level of blend of bovine blood and rumen content inclusion increased in the diet of finisher broilers.

On the contrary, these results disagreed with those reported by Adeniji and Oyeleke (2008) who reported that, including over 6% sun dried rumen content in Muscovy duckling diets resulted in decrease growth and increased the values of feed conversion ratio as compared to those fed the control diet.

Our results showed beneficial effects of adding acidifiers in the diets of broiler performance. These results are in agreement with previous study of Falaki *et al.,* (2010) Acidifiers are mixed with the feed to create an acidified pH which provides a favorable environment in the digestive tract of broilers led to increase digestion of dietary nutrients such as proteins. They act as growth promoters and feed preservatives in poultry where they can also maintain the feed hygiene (Dibner and Buttin, 2002; Anjum and Chaudhry, 2010). Fallah and Rezaei (2013) reported that acidifier significantly increased the final body weight as compared to the control group. Lückstädt *et al.* (2004) showed that dietary acidifiers led to significantly increase final body weight of broiler chicken compared with the control group. The organic acids supplementation are desirable for gut microflora, mineral retention and bone mineralization through increased digestibility and availability of nutrients as stated by Ziaie et al. (2011). Mohammadpour *et al.*(2014); Woo *et al.* (2006) showed that organic acids are thought to promote growth rate by managing the intestinal microbial ecology in the digestive organs, allowing commensal bacteria to flourish while reducing pathogenic bacteria that can create poisons. The favorable effect of acidifiers, such as organic acid, on

performance is linked to increased nutrient efficiency and improved digestibility (Nourmohammad *et al.,* 2012). Lückstädt *et al.* (2004) observed that the group taking the acidifier had consumed more feed than the control group throughout the whole experimental duration. This discrepancy may be a result of the difference in acidifier type and concentration, experimental animals, acidifier formulations and test sites, as well as diet type and composition, and other factors (Qi Gao *et al.,* 2021). Mourya *et al*., (2011) and Hashemi *et al.* (2012), reported that dietary supplementation with acidifiers, had a positive impact on FCR.

Carcass traits:

The effects of different levels of dried silage of rumen content, acidifiers and their interaction on carcass characteristics are shown in Table 3. Carcass percentage and carcass organs were not significantly (P>0.05) influenced by the levels of dried silage rumen content compared the control group, except heart percentage was decreased at 10% of dried silage rumen content. Feeding on diets containing dried silage rumen content or acidifiers insignificantly reduced percent of abdominal fat content comparing to the control group. Adding acidifiers to the experimental diets were not affecting on carcass percent or carcass organs percent, except spleen percent which was decreased with acidifiers diets. Carcass percent and organs were not influenced by the interaction between dried silage of rumen content and acidifiers.

Our results agree with that of Elfaki and Abdelatti (2015) who found that birds fed dried rumen content achieved high carcass weights than birds fed control diet. Yitbarek *et al.* (2016) showed that carcass characteristics of birds fed diets containing different levels of DBRCM were not statistically different in edible carcass yield comparing with the control group. Also, Esonu *et al.* (2011) found that there were no significant differences in dressing percentage of birds fed diets containing mixture of fermented bovine blood and rumen digesta. Onu *et al.* (2011) showed that broiler chicks fed on different levels of Bovine blood and rumen content mixture had no significant differences existed in the carcass characteristics of the birds. On the other hand, Petek *et al.* (2000) reported that, weights of carcass, gizzard and liver as percentage of live body weight were significantly differ among broiler fed diets with 10 and 20% dried rumen content.

Our results agree with other studies which reported that the acidifiers did not affect carcass characteristics and dressing yield of broiler chickens (Ghasemi *et al*., 2014; Kopecký *et al*.,2012). The results of Fallah and Rezaei (2013) showed that weights of carcass, proventricalus, heart, kidney, spleen, liver and full gizzard were not significantly different by acidifiers supplementation in broiler diets. Also, Brzoska *et al.* (2013) found that carcass parts, including breast and leg muscles, gizzard, liver and abdominal fat weights were not significantly different for broiler chicks fed diets supplemented by acidifiers.

Table 3. Effect of feeding dried silage of rumen content and acidifiers on carcass yield and internal organs.

Treatments	Carcass%	Liver%	Gizzard%	Heart%	Leg%	Spleen%	Head%	Abdominal fat %
Dried silage of rumen content (A)								
Control 0% DSRC (A1)	68.96	3.88	2.26	0.85^{a}	5.77	0.26	3.82	1.81
DSRC 5% (A2)	69.57	3.93	2.11	0.89^{a}	5.39	0.22	3.66	1.20
DSRC 7.5% (A3)	69.69	3.48	2.04	0.69^{ab}	5.93	0.20	3.80	1.17
DSRC 10% (A4)	70.66	3.52	2.04	0.62^{b}	5.34	0.25	3.84	1.60
SEM	0.893	0.179	0.099	0.054	0.231	0.024	0.110	0.221
Sign	NS	NS	NS	**	NS	NS	NS	NS
Acidifiers (B)								
acidifiers (B1) 0.0g/kg diet	70.23	3.71	2.20	0.76	5.78	0.26^{a}	3.79	1.51
acidifiers (B2) 0.5g/kg diet	69.21	3.69	2.03	0.77	5.44	0.20^{b}	3.77	1.38
SEM	0.6316	0.126	0.070	0.04	0.164	0.017	0.078	0.156
Sign	NS	NS	NS	NS	NS	*	NS	NS
AB Interaction								
A1*B1	69.16	3.96	2.43	0.93	6.17	0.28	3.81	1.90
A1*B2	68.76	3.80	2.10	0.78	5.37	0.23	3.83	1.72
A2*B1	71.25	3.72	2.21	0.86	5.48	0.26	3.66	1.08
A2*B2	67.88	4.13	2.01	0.93	5.30	0.18	3.67	1.32
A3*B1	70.41	3.44	2.10	0.63	5.72	0.24	3.70	1.27
A3*B2	68.97	3.53	1.98	0.76	6.14	0.16	3.91	1.07
A4*B1	70.12	3. 37	2.05	0.62	5.74	0.25	3.99	1.80
A4*B2	71.21	3.31	2.02	0.63	4.94	0.25	3.67	1.39
SEM	1.263	0.253	0.140	0.076	0.327	0.034	0.156	0.312
Sign	NS	NS	NS	NS	NS	NS	NS	NS

Means within the same column having different superscripts are significantly different at (p≤0.05). SEM: Standard error of the means. NS: Not significant. *: Significant at p≤0.05 **: Significant at p≤0.01

Serum Blood Parameters:

The blood parameters are often used as indicator for disease diagnosis, nutrition status and health condition of the birds. Table (4) illustrates biochemical serum blood parameters of broiler chicks at 6 weeks of age. As shown in Table 4 , feeding on diets containing dried silage of rumen content and/or acidifiers to broilers did not affect significantly on serum levels of total protein, albumin, globulin, α globulin, β globulin and γ globulin complaining with the control group. From Table 4 the interaction between rumen content and acidifiers did not affect on the pervious serum blood parameters.

Table 5 showed that dietary dried silage of rumen content did not affect significantly on broiler blood serum content of Total lipids, Triglycerides, Cholesterol, LDL, ALT, AST and Alkaline phosphatase. Serum levels of HDL was affected significantly by dried silage of rumen content, which the experimental diet containing 5% DSRC achieved the high value of HDL followed by the control group then the diet of 10% DSRC and less value with diet containing 7.5% DSRC. Regarding to the effect of dietary acidifiers there is no significant effect in blood parameters in Table 5 except on serum content of total lipids and triglycerides, which significant affected by acidifiers. Total lipids was decreased, however, triglycerides increased by dietary acidifiers. The interaction between DSRC and acidifiers was not significant on the criteria of blood parameters in Tale 5.

Our results agree with Obadire *et al.,* (2020) who stated that serum content of AST and ALT enzymes were not significantly affected by dietary bovine rumen content for broiler chickens. Elfaki and Abdelatti (2015) who stated that dried rumen content up to 10% in broiler diets did not significantly affected on plasma total protein, cholesterol and total lipids. Also, Mosaad *et al.* (2010) showed that dried rumen content up to 20% in the diets of ducks did not significantly influence the serum parameters of total protein, albumin, globulin, albumin/globulin ratio. Blood total protein is usually a reflection of protein quality of the diets thus the similar values recorded for the experimental groups indicated that the protein levels in the rumen content were sufficient to sustain the normal protein required in the blood of broiler chickens (Eggum, 1970). However, Mwesigwa *et al.* (2020) revealed that broiler fed dried goat rumen content up to 10% of the diet had decreased significantly blood Glucose, cholesterol, low density lipoprotein and high density lipoprotein, but triglycerides was increased comparing to the control treatment.

Table 4. Effect of dried silage of rumen content and acidifiers on serum blood parameters of broiler chicks at 42 days of age.

Treatments	Total protein gm/dl	Albumin gm/dl	Globulin gm/dl	α globulin gm/dl	β globulin gm/dl	γ globulin gm/dl
Dried silage of rumen content (A)						
Control 0% DSRC (A1)	5.617	2.600	3.016	1.669	1.029	0.829
DSRC 5% (A2)	5.613	2.610	3.003	1.696	1.046	0.875
DSRC 7.5% (A3)	5.593	2.624	2.970	1.732	1.059	0.829
DSRC 10% (A4)	5.569	2.613	2.956	1.689	1.082	0.892
SEM	0.0996	0.0959	0.1530	0.0379	0.0447	0.0403
Sign.	NS	NS	NS	NS	NS	NS
Acidifiers (B)						
Acidifiers (B1) 0.0g/kg diet	5.573	2.614	2.960	1.682	1.081	0.850
Acidifiers (B2) 0.5g/kg diet	5.623	2.610	3.013	1.711	1.027	0.862
SEM	0.0704	0.0678	0.1082	0.0268	0.0316	0.0285
Sign.	NS	NS	NS	NS	NS	NS
AB Interaction						
A1*B1	5.774	2.654	3.120	1.672	1.132	0.812
A1*B2	5.460	2.546	2.913	1.666	0.926	0.845
A2*B1	5.506	2.688	2.820	1.659	1.039	0.839
A2*B2	5.720	2.532	3.186	1.732	1.052	0.912
A3*B1	5.486	2.466	3.020	1.666	1.066	0.845
A3*B2	5.700	2.782	2.920	1.799	1.052	0.812
A4*B1	5.526	2.646	2.880	1.732	1.086	0.905
A4*B2	5.612	2.580	3.033	1.646	1.079	0.879
SEM	0.1409	0.1356	0.2164	0.0536	0.0632	0.0569
Sign.	NS	NS	NS	NS	NS	NS

a-b: Means within column with different superscripts are significantly different. Glob. = globulin; Alb. = albumin

Table 5. Effect of dried silage of rumen content and acidifiers on some serum blood parameters of broiler chicks at 42 days of age.

Treatments	Total lipids g/l	Triglycerides mg/dl	Cholesterol mg/dl	HDL mg/dl	LDL mg/dl	ALT Iu/l	AST Iu/l	Alkaline Phosphatase u/100ml
Dried silage of rumen content (A)								
Control 0% DSRC (A1)	59.32	180.05	211.66	39.65^{ab}	90.79	66.12	58.865	7.8158
DSRC 5% (A2)	58.15	180.83	206.84	42.46^{a}	90.05	66.25	55.759	7.5746
DSRC 7.5% (A3)	56.92	181.96	205.46	37.77 ^{b}	90.10	66.47	56.433	7.5169
DSRC 10% (A4)	54.29	177.87	214.26	38.37^{ab}	93.36	65.76	58.871	7.6013
SEM	2.701	2.871	2.986	1.101	1.893	0.725	0.950	0.117
Sign.	NS	NS	NS	*	NS	NS	NS	NS
Acidifiers (B)								
Acidifiers (B1) 0.0g/kg diet	60.04^{a}	177.19^{b}	209.39	39.79	90.69	65.57	57.442	7.669
Acidifiers (B2) 0.5g/k diet	54.30^{b}	183.16^{a}	209.72	39.33	91.46	66.73	57.522	7.586
SEM	1.910	2.029	2.112	0.778	1.339	0.513	0.672	0.082
Sign.	*	*	NS	NS	NS	NS	NS	NS
AB Interaction								
A1*B1	60.59	181.26	212.37	39.01	90.48	64.26	58.73	7.9258
A1*B2	58.05	178.86	210.95	40.28	91.10	67.978	59	7.7058
A2*B1	64.72	176.73	205.43	43.06	89.84	65.81	56.708	7.6213
A2*B2	51.59	184.94	208.24	41.86	90.26	66.68	54.81	7.5280
A3*B1	60.85	178.79	205.20	38.86	88.41	66.378	54.884	7.5058
A3*B2	52.99	185.13	205.75	36.68	91.79	66.56	57.982	7.5280
A4*B1	53.99	172.00	214.59	38.26	94.04	65.81	59.446	7.6213
A4*B2	54.59	183.73	213.92	38.48	92.68	65.69	58.296	7.5813
SEM	3.8201	4.0594	4.2234	1.5564	2.6776	1.0251	1.3428	0.1647
Sign.	NS	NS	NS	NS	NS	NS	NS	NS

a-b: Means within column with different superscripts are significantly different. HDL= high density lipoprotein-cholesterol; LDL= low density lipoprotein-cholesterol.

Regarding to acidifiers effect, our results are in line with Dousa *et al.* (2016) who found that blood serum parameters of broiler chickens were not affected significantly by dietary inclusion of acidifiers comparing with the control treatment. Fallah and Rezaei (2013) found the blood parameters of broiler chickens were not affected by acidifiers except triglycerides and cholesterol which were decreased at 42 days of age. Also, Ogunwole *et al .,* (2017) reported that serum blood cholesterol content of broiler chickens fed acidifiers was not significantly different from those of the

control group, however total protein was increased. Blood plasma parameters of broiler chicks, including glucose, total protein, triglycerides, total cholesterol and HDL cholesterol were not affected by acidifier (Brzoska *et al.*, 2013)

CONCLUSION

From the economic of view, it can be concluded that inclusion dried silage of cow rumen content up to 10% of the diets improve broiler performance and had no adversely effect on carcass traits, immunity or blood parameters. Also, adding acidifiers at a level of 0.5g/kg diet can be improving broiler performance.

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تاثير علائق سيلاج محتويات الكرش المجفف بدون او مع بعض الاحماض العضويه علي الاداء الانتاجي والمناعي لكتاكيت اللحم

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الملخص

اجريت هذه التجربه بهدف تقييم تأثير سيلاج محتوى الكرش المجفف (DSRC) والاحماض العضويه على أداء النمو لكتاكيت التسمين. حيث استخدام عدد ثلاثمائة وعشرون كتكوت تسمين غير مجنسة عمر يوم من سلاله (كوب 500). وزعت الطيور عشوائياً على ثمانية معاملات غذائيه تجريبية (40 طائراً / معاملة) بواقع أربعة مكررات (10 طيور / مكرر) بتصميم عشوائي تام. وكانت المعاملات الغذائيه التجريبيه تحتوي علي سيلاج محتوي الكرش المجفف بمستويات 0 ، 5 ، 7.5 و 10٪ بدون أو مع 0.5 جم من الاحماض العضويه/ كجم علف. استمرت التجربة لمدة ستة أسابيع من العمر. أظهرت النتائج المتحصل عليها أن استخدام سيلاج محتوي الكرش المجفف في علائق كتاكيت التسمين من سلاله (كوب 500) حتي مستوي 10% مدعما بالاحماض العضويه بمعدل 0.5 جم/ كجم علف صحبه زياده معنويه في الوزن الحي النهائي للكتاكيت ومعدل الزياده في الوزن الكلي ومعدل استهلاك العلف الكلي مع تحسن معدل التحويل الغذائي . كما اوضحت النتائج عدم تاثير صفات جوده الذبيحه ومعاملات الدم بمستويات الاحلال المختلفه من سيلاج محتوي الكرش المجفف بدون او مع الاحماض العضويه باستثناء ارتفاع مستوي الدهون البروتينيه عاليه الكثافه (HDL) في سيرم دم كتاكيت المجموعه التجريبيه المغذاه علي عليقه تحتوي علي 5% سيلاج محتوي الكرش المجفف مقارنه بباقي المجموعات التجريبيه . ومن الناحيه الاقتصاديه تخلص هذه الدراسه الي امكانيه استخدام سيلاج محتوي كرش البقر المجفف حتي مستوي 10% في علائق كتاكيت التسمين ويكون ذلك مصحوبا بتحسن في الاداء الانتاجي للكتاكيت مع عدم وجود اي تاثير سلبي علي كل من صفات الذبيحه او الحاله المناعيه او قياسات سيرم الدم لكتاكيت كوب 500 . اضافه لما سبق يمكن استنتاج ايضا ان اضافه الاحماض العضويه حتي 0.5 جم / كجم علف مصحوبا بتحسن اداء النمو وخصائص جوده الذبيحه والحاله المناعيه لكتاكيت التسمين من سلاله كوب 500.