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**Mohanad Fadhil Hussain Al-Musodi**  
 Department of Animal,  
 Agriculture College, Kerbala  
 University, Iraq

**Mustafa Hadi Hamid**  
 Department of Animal,  
 Agriculture College, Kerbala  
 University, Iraq

**Ali Hashim Subeh**  
 Department of Animal,  
 Agriculture College, Kerbala  
 University, Iraq

**Haneen Hameed Najj**  
 Department of Animal,  
 Agriculture College, Kerbala  
 University, Iraq

**Corresponding Author:**  
**Mohanad Fadhil Hussain Al-Musodi**  
 Department of Animal,  
 Agriculture College, Kerbala  
 University, Iraq

## The effect of molasses supplement to drinking water on some productive and Carcass characteristics in broiler chicken

**Mohanad Fadhil Hussain Al-Musodi, Mustafa Hadi Hamid, Ali Hashim Subeh and Haneen Hameed Najj**

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### Abstract

The study was conducted to find out the effect of adding molasses to the broiler meat drinking water in some productive qualities and carcass recipes, and used 90 one-day-old birds divided into three groups equally in the field of poultry birds at the Faculty of Agriculture, Karbala University. Molasses was added by 3% to the water of the birds of the second group and 6% to the birds of the third group, leaving the first group without addition. The following criteria were taken: body weight per week, weight gain, the percentage of dietary conversion, and the amount of feed intake, in addition to the characteristics of the carcass, and the following criteria were taken, The addition of molasses had a significant effect on body weight, weekly weight gain, spleen weight, liver, two eyes, and bowel length, as the two treatment groups outperformed the control group.

**Keywords:** Molasses addition, broiler meat, drinking water, productive qualities

### Introduction

Chicken breeding projects include two main types, layer and broiler chickens, and in fact, poultry projects for the breeding of meat spirits are the ones that occupy the largest space in the poultry sector, (Ezeh *et al.*, 2012) <sup>[1]</sup>, These projects consume large quantities of cereals and enter into competition with human nutritional needs, so practical research has turned to the use of alternatives to cereals or the addition of other materials such as products of various food industries by-products to reduce competition with humans and also to reduce economic expenses (Molina *et al.*, 2008) <sup>[2]</sup>. When sucrose can no longer be easily extracted from sugar for straightforward crystallization, the residue left behind is called molasses, a thick, syrup-like liquid with a brown color. (Piccioni, 1989) <sup>[9]</sup>, When it comes to sources of energy, molasses—a dark, viscous liquid made from sugarcane—is less costly than maize, wheat, rice, sorghum, and other cereal grains (Ahmad, 2004) <sup>[4]</sup>, Molasses is composed of natural substances that are not sugar, such as sucrose, glucose, fructose, and raffinose. (Habibu *et al.*, 2014) <sup>[5]</sup>, Molasses has a higher concentration of calcium, potassium, magnesium, sodium, copper, iron, manganese, chlorine, and sulphur than cereal grains that are typically used, Molasses is a respectable-grade feed addition in this sense. Feed millers are reluctant to use molasses despite its many benefits since it clogs mixers and decreases the effectiveness of mixing micronutrients. An approach is to add molasses to the broiler chickens' drinking water. Nevertheless, there is little research on adding molasses to drinking water in addition to a regular diet. (Ndelekwute *et al.*, 2011; Farghly *et al.*, 2018) <sup>[6, 7]</sup>. The benefits of molasses for health are numerous, Molasses has been widely touted for its therapeutic qualities due to its high mineral content. (Wang *et al.*, 2011) <sup>[8]</sup> As everyone is aware, the immune system is essential for defending healthy tissue from infections and other harmful agents. Endocrine modulators so frequently target the immune system, and multiple studies have demonstrated that exposure to natural or synthetic substances may modify the immunological response, potentially resulting in a variety of harmful effects (De Jong and Van Loveren 2007) <sup>[9]</sup> The physiological effects of various sugarcane extracts and their constituents vary [Koge *et al.*, 2002] <sup>[10]</sup>. According to their findings, the sugarcane of molasses extract boosts immunological responses, has hepatoprotective and antioxidant qualities, and strengthens

defense against bacterial and viral illnesses. (Saska and Chung 2002) [11]. It was mentioned (Habibu *et al.*, 2014) [5] that the addition of amosslas to the drinking water of broilers led to a significant increase in the weights of the chicks and improved blood qualities in them compared with the chicks of the control group, and also pointed (Yasin *et al.*, 2018) [12] to the improvement of carcass qualities after adding molasses to the broiler drinking water, as well as adding it to the broiler drinking water led to an improvement in the percentage of dietary conversion and the amount of feed intake and a significant increase in the weekly increase in the weight of the chicks (Ndelekwute *et al.*, 2011) [13, 25], and decrease mortality (Ndelekwute *et al.*, 2010) [13, 25]. Therefore, this study investigated the effect of adding two different concentrations of molasses to Iraqi dates on some productive qualities and carcass recipes in broilers

## Materials and Methods

The experiment was conducted in the poultry field at the Faculty of Agriculture, Karbala University, and used 90 one-day-old non-naturalized Ross meat chicks that brought the chicks from one of the Karbala hatcheries and distributed the chicks to 3 groups in each group 3 repeaters, each repeater includes 10 chicks. The cage system was used in breeding so that each cage included 10 chicks., The chicks were randomly weighed, distributed to cages, taught and vaccinated at one day of age by spraying a mixed vaccine ND/IB ATR clon30 type Intervet. The Newcastle nd vaccine was then returned at the ages of 30, 20, 10, Lasota,clon30, clon30 respectively with drinking water. The chicks were vaccinated against Gumboro disease with drinking water and the Hipra Gumboro vaccine was used at the age of 13 days. The chicks were fed freely Ad. libitum for the duration of the experiment on a standard sheet in which animal protein was used and water was freely introduced. Date molasses was added at a rate of 3% with drinking water to the chicks of the second group and 6% with the water of the third group.

## The following measurements were taken

### Body weight/ grams

The chicks were weighed on the first day of the experiment individually and the weighing process continued every weekend, the weights were recorded for each iterator and the weight gain was calculated by the following equation  
Weight at the end of the week-weight at the first of the week

### weekly feed consumed / grams

According to (tarrage and Puchal, 1977) [14], according to the feed consumed by the chicks of each repeater. Using the following equation.The amount of feed added the first week – the amount of feed remaining at the end of the week

### Food conversion ratio (FCR)/ grams

Is the number of grams of feed consumed per gram of the weight gain of the chicks ' body and calculated by applying the following equation Food conversion coefficient= amount of feed consumed during a certain period (g) /Average weekly weight gain.

### Carcass qualities

I took 3 birds at random from each group and weighed them individually and then slaughtered and disemboweled them, and weighed the carcass alone with parts of it(chest,thighs, spleen, longest intestines,liver) And calculated after the clearance rate (Kazem *et al.* 2019) [15, 19]

### Statistical analysis

The data was statistically analyzed using the ((Statistical Analysis System) SAS program and thethe significant differences between the transactions were measured using the least significant difference (LSD), (SAS, 2010) [16].

## Results and Discussion

### 1. Weight body weight

The superiority of the second and third groups over the control group in the rate of body weight is noted.

**Table 1:** the effect of treatment on body weight in all groups/Kg

	Means and Standard error/ grams				
	1 <sup>st</sup> week	2 <sup>nd</sup> week	3 <sup>rd</sup> week	4 <sup>th</sup> week	5 <sup>th</sup> week
Control	170.67±6.98	494.67±38.68	842.67±35.52	1376.67±35.13 b	1999.03±59.68 b
G2 (3%) molasses	186.67±19.57	517.27±31.55	861.67±14.24	1477.67±34.33 ab	2125.33±64.96 a
G3 (6%) molasses	176.67±7.59	520.00±30.00	896.37±17.10	1570.00±10.00 a	2114.17±33.29 a
Lsd	44.203	116.36	83.759	100.17	108.38
P (Value)	n.s	n.s	n.s	0.05	0.5

The aim of this study is to investigate the effect of adding molasses to broiler meat drinking water in two different concentrations on body weight, nutritional conversion rate,the amount of feed consumed and the weight gain of birds in addition to the carcass qualities,the results of the study have shown a moral superiority in the weights of birds of the second and third groups in body weight compared with the control group as shown in Table 1, this may be due to the effect of molasses, which contains high-energy nutrients, as it contains 61% sugars, minerals and salts, in addition to large amounts of thymine and riboflavin and vitamin niacin (Chaira, 2007) [17], This result is consistent

with what was stated when adding glucose to his field experiments and proved that adding sugars to the diet of birds led to an increase in body weight, and this result is consistent with (Kadhim *et al.*, 2019) [15, 19] if they indicated an increase in the weights of meat chicks after adding date molasses to drinking water.

### 2. Weekly weight gain

The superiority of the second group in the rate of weekly weight gain over the control group body weight is noted in the third week of the experimental period

**Table 2:** the effect of treatment on weekly weight gain./ grams

Means and Standard error/ grams				
	1 <sup>st</sup> week	2 <sup>nd</sup> week	3 <sup>rd</sup> week	4 <sup>th</sup> week
Control	324.00±33.85	348.00±37.97	534.00±70.61 b	589.03±102.82
G2 (3%) molasses	330.60±13.30	360.70±26.99	600.00±38.50 A	678.67±26.43
G3 (6%) molasses	343.33±27.43	409.70±39.40	573.63±16.70 Ab	644.16±28.75
Lsd	91.034	121.91	64.12	119.76
P (VALUE)	n.s	n.s	0.05	n.s

The addition of date molasses to the drinking water of meat broilers had a significant effect on the rate of weight gain in the chicks, and this corresponds to what was mentioned (Hidalgo *et al.*, 2009) [24, 28] and ndelekwute *et al.*, 2010) [13, 25], who indicated a significant increase in the rate of weekly weight gain of meat chicks that molasses was added to their drinking water, This may be due to the nutritional effects of molasses, as it increases the energy level of the Bush and increases the palatability of the feed. The reason for this increase was attributed to the increased formation of short-chain fatty acids such as acetic acid and propionic acid in

one-eyed chicks (Gultemirian *et al.*, 2014) [27], which in turn leads to a significant increase in weight gain. The results of the current study are consistent with Habibu *et al.*, 2014 [5], which indicated a significant increase in weight gain in chicks after adding molasses to drinking water at a dose of 7 ml.

### 3. Feed intake each bird per week.

It is noted that there are no sperm differences in the rate of feed intake per week, as seen in Table 3

**Table 3:** effect of treatment on feed intake/ grams

Means and Standard error/ grams				
	1 <sup>st</sup> week	2 <sup>nd</sup> week	3 <sup>rd</sup> week	4 <sup>th</sup> week
Control	510.80±44.54	665.63±24.83	576.7±284.51	926.50±32.25
G2 (3%) molasses	441.73±7.32	617.93±26.11	779.8±28.37	825.13±32.02
G3 (6%) molasses	458.33±20.07	620.20±25.05	806.1±28.35	805.17±62.22
Lsd	98.712	87.695	574.05	153.96
P (Value)	n.s	n.s	n.s	n.s

### 4. Food conversion ratio (FCR)

It is noted from Table 4 that there are no significant

differences between the experiment groups in the percentage of food conversion

**Table 4:** The effect of treatment on FCR/ grams

Means and Standard error/ grams				
	1 <sup>st</sup> week	2 <sup>nd</sup> week	3 <sup>rd</sup> week	4 <sup>th</sup> week
Control	1.63±0.30	1.95±0.23	1.59±0.16	1.63±0.20
G2 (3%) molasses	1.33±0.07	1.72±0.07	1.30±0.04	1.21±0.05
G3 (6%) molasses	1.33±0.04	1.65±0.12	1.40±0.05	1.36±0.07
Lsd	0.6294	0.545	0.3473	0.6387
P (VALUE)	n.s	n.s	n.s	n.s

The data of the current study correspond to what was mentioned (Sadr and moeini, 2011) [20], which indicated that the addition of molasses to the drinking water of broilers did not affect the amount of feed eaten per week and the percentage of food intake, despite producing high weights compared to birds that did not feed on molasses. Also (Tang *et al.* 2011) [22] pointed out that the amount of feed consumed per week by birds, as well as the percentage of food conversion, was not affected by the addition of molasses to the feed. The results of the current study are consistent with Amjadian and others (2016) [23, 32], which indicated that there was no significant effect of molasses on the amount of feed consumed and the percentage of nutritional conversion in broilers.

### 5. carcass characteristics

It is noted from the table 5 that there were significant differences in the weight of the cecum and the length of the intestine, as the two treatment groups were significant superior to the control group, while the weight of the wings, pancreas, chest and adhesion ratio were not affected in all the experiment groups, while there was a significant

decrease in the weight of the spleen and a significant increase in the weight of the liver in the two treatment groups compared to the control group.

It is noted from Table 5 that the chicks of the second and third groups significantly outperformed of the control group in the weight of the cecum and the length of the intestine, and this may be due to the effect of adding molasses, as it increases the fermentation processes in the cecum and the small intestine, so that the weight and length of these two organs increase and as a result improve digestion processes, and this result corresponds to (Guervo *et al.*, 1972) [30], who pointed to the positive effects of molasses on improving fermentation in the gastrointestinal tract in chicken chicks. The results of this study are consistent with the findings (Elsiddig *et al.*, 2022) [31], which indicated an increase in the weight of the cecum and the length of the small intestine in broilers after adding molasses to their rump. The increase in liver weight in the two treatment groups compared to the control group, As shown in Table 2, may be due to the effect of adding molasses, which causes an increase in liver efficiency and activity and an increase in the stock of nutrients, especially

animal starch, if the type and rate of bioactivity of the liver increases, and this conclusion corresponds to what he mentioned (Amjadian *et al.*, 2016) [23, 32], which indicated an increase in liver weight in meat chicks after adding molasses to drinking water. As for the weight of the spleen, it decreased significantly in the second and third groups

compared to the control group, and this may indicate an improvement in the herd's health status and a decrease in the level of infections in the body (Martínez *et al.* 2021) [33], as infections lead to an increase in the size and number of spleen cells and eventually weight gain (Wang *et al.* 2016) [34].

**Table 5:** the effect of treatment on carcass characteristics.

Means and Standard error					
Adjectives	Control	G2 (3%) molasses	G3 (6%) molasses	LSD	P (Value)
Spleen weight/g	0.41±3.60a	0.11±2.56b	0.38±2.59b	1.0324	0.05
Thigh weight/g	450.60±27.80	5.76±500.60	18.46±480.60	60.255	n.s
Gizzard Weight /g	1.24±30.64	2.47±31.23	1.97±32.38	6.0449	n.s
Liver weight /g	4.90±56.67b	2.12±61.48a	5.23±64.19a	3.318	0.05
Proventriculus Weight /g	0.54±10.26	0.39±10.21	0.73±10.28	1.772	n.s
Ceca weight /g	0.74±17.42	1.37±19.50	±18.400.65	1.0916	0.05
Bowel length/cm	8.63±150.20b	8.95±178.60a	20.56±166.40a	14.757	0.05
Wings weight /g	12.08±159.00	7.31±164.00	10.17±165.40	30.965	n.s
pancreas weight /g	0.96±6.45	0.24±4.53	0.45±5.66	1.9497	n.s
Chest weight/g	47.21±653.60	25.94±725.80	15.24±715.00	99.613	n.s

### Conclusion

The study demonstrated that the addition of molasses to the drinking water of broiler chickens significantly enhanced their body weight and weight gain, with a notable improvement in carcass characteristics such as cecum weight and intestinal length. The results suggest that molasses, due to its high sugar, mineral content, and other nutrients, effectively boosts energy levels and digestion processes, leading to better overall growth and health outcomes in broilers. However, while molasses positively influenced certain aspects of poultry production, it did not significantly impact feed intake or food conversion ratios, indicating that its benefits are primarily linked to weight and carcass quality rather than feed efficiency. These findings support the potential of molasses as a cost-effective feed additive that can enhance productivity in broiler chicken farming.

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