Effect of adding different levels of lemon grass leaves *Cymbopogon citratus* to the diet and its extract in drinking water on the quality characteristics of the carcass to broiler Chickens (Ross 308)

Dheyaa Hmazah Yasir Al-Awadi and Nihad Abdul-Lateef Ali Al-Nadawi*
Department of Animal Production, College of Agriculture, Al-Qasim Green University, Iraq.
*Corresponding author: dr.nihad@agre.uoqasim.edu.iq
Received: October 21th 2020; Accepted: November 11th 2020

**Abstract**
This experiment was conducted at the poultry farm of the college of Agriculture, University of Al-Qasim Green for the period from 18/9/2019 to 23/10/2019. The study was aimed to the effect of adding different levels of lemongrass leaves (*Cymbopogon citratus*) to the diet or its extract to drinking water on the qualitative qualities of the carcass to broiler chickens (Ross 308). In the experiment, 225 unsexed broiler chicks (Ross), which obtained from Al-Anwar hatchery, it the were randomly distributed on 15 pen, with 5 experimental treatments,45 birds for each treatment. Each treatment included three replicates per 15 birds. The treatments of the experiment were as follows: First treatment: control group free from any addition . The second treatment: a basic feed added to 10 g of lemon grass / kg feed, the third treatment: a basic feed added with 20 g of lemon grass / kg feed, The fourth treatment: adding 100 ml of the aqueous extract of the lemongrass / liter of drinking water, and the fifth treatment: adding 200 ml of the aqueous extract of the lemongrass liter of drinking water. The experiment included studying the following characteristics: the relative weights of the main and secondary carcass parts, and the relative weights of the eating giblets. As for the live body weight before slaughter and the weight of the carcass, the results showed that the fourth treatment and the fifth treatment were significantly higher than the rest of the experiment.

**Keywords:** Lemon grass, *Cymbopogon citratus*, Quality characteristics, Carcass of broiler.

**Introduction**
Medicinal plants contain many active compounds with different effects and they are either present in the plant or in the form of metabolic products and these materials are divided into either a toxic and deadly type or beneficial and nutritious (Al-Ani, 2002). Herbs have been used in the treatment of health problems that appear in poultry, these were used Medicinal and aromatic plants and their extracts for their in improving health (Al-Shahat, 2000). Some plant extracts have a stimulating effect on the digestive system of animals and poultry, as they improve the function of organs, especially the liver, and this leads to an increase in digestive enzymes that increase the benefit from eating food and meeting the need of the body (Jamroz and Kamel, 2002). the feeds and natural additives are among the components that affect improving growth as well as food conversion, so plants and medicinal herbs have been used in recent years to feed animals (Hassan and Muhamad, 2007). Plant extracts have been used to treat many diseases, especially animal respiratory diseases (Al-Shahat, 1986). and from this plant it is the Lemon grass, whose scientific name is *cymbogon citratus* It is considered one of the medicinal plants wide use since ancient times and it is an aromatic herb perennial with long and smooth leaves. It lives in hot countries such as Egypt, Sudan, Saudi Arabia, India, Ceylon and East Africa (El-Degwy, 1996). Recent and ancient studies have shown that this plant has many medicinal benefits for its high content of volatile oil, which contains many compounds, especially the main compound Citral, which ranges between 65-90% and the compound myosin 10-25% and neighbors 1-4%, as this plant is used as a disinfectant and analgesic for headaches. And the treatment of rheumatism, as it is antihypertensive and is useful in
treated ulcers and colitis as well as cold and flu
diseases (Al-Rawi and Jakerh, 1988). Inhibitor of the
growth of microorganisms and fungi (Al-Sadiq,
2006). It has also been used industrially for food
preservation and flavor addition (Tarab and Shawwa,
2000). With the increase in the global population of
nearly seven billion people, and expectations that
this number will reach eight billion in 2020 and with
an annual increase of 93-95 million (Gore, 1993).
What accompanied and will accompany this increase
from the diseases of the modern era and the danger
resulting from the side effects of the chemical drugs
used, all these reasons were sufficient to go or
advise people to go to nature in search of plants
with a medical effect in treating diseases and that
most of the diseases that we suffer from find the
solution in nature more than in pharmacy, and that
pharmacology is used in the broadest field of nature
herbs for the composition of drugs and medicines
(Al-Mayah, 2001). Based on the above of the
foregoing, and given the great importance of the
leaves of the lemon grass plant, the aim of the
present study was to know the nutritional value of
the powder of the lemon grass plant their use and
determination of the best proportions added to the
diet or to drinking water that can be used in poultry
diets and its the quality characteristics of, which we

**Materials and Methods**

This experiment was conducted at the poultry farm
of the college of Agriculture, University of Al-Qasim
Green for the period from 18/9/2019 to 23/10/2019.
The study was aimed to the effect of adding
different levels of lemongrass leaves (Cymbopogon
citratus) to the diet or its extract to drinking water to
on on the quality characteristics of the carcass of
broilers broiler Chickens (Ross 308). In the
experiment, 225 unsexed broiler chicks (Ross), which
obtained from Al-Anwar hatchery, it were
randomly distributed on 15 pen, with 5 experimental
treatments, 45 birds for each treatment. Each
treatment included three replicates per 15 birds. The
treatments of the experiment were as follows: First
treatment: control group free from any addition .
The second treatment: a basic feed added to 10 g of
lemon grass / kg feed, the third treatment: a basic
feed added with 20 g of lemon grass / kg feed, The
fourth treatment: adding 100 ml of the aqueous
extract of the lemongrass / liter of drinking water,
and the fifth treatment: adding 200 ml of the
aqueous extract of the lemongrass / liter of drinking
water. The experiment included the study of the
following traits: the relative weights of the main and
secondary carcass parts, and the relative weights of
the edible internal organs. The Completely
Randomized Design was used to study the effect of
different treatments on the studied traits, the
significant differences between the averages were
compared using Duncan's Multiple Range Test
(Duncan, 1955) and the SAS (SAS, 2012) was used to
analyze the data.

<table>
<thead>
<tr>
<th>Feed material</th>
<th>Initiator diet (1-21) %</th>
<th>Final diet (22-35 day) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>yellow corn</td>
<td>48.2</td>
<td>58.7</td>
</tr>
<tr>
<td>Local wheat</td>
<td>8</td>
<td>7.5</td>
</tr>
<tr>
<td>Soybean meal (44% protein)</td>
<td>28.5</td>
<td>20.5</td>
</tr>
<tr>
<td>Concentrated Protein*</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Vegetable oil (sunflower)</td>
<td>4</td>
<td>2.5</td>
</tr>
<tr>
<td>limestone</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Food salt</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Total</td>
<td>%100</td>
<td>%100</td>
</tr>
</tbody>
</table>

**The Calculated Chemical Analysis**

<table>
<thead>
<tr>
<th></th>
<th>Metabolized Energy (kcal/kg)</th>
<th>Crude protein (%)</th>
<th>Lysine (%)</th>
<th>Methionine + Cysteine (%)</th>
<th>Raw fiber (%)</th>
<th>Calcium (%)</th>
<th>Phosphorus availability (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3079.85</td>
<td>21.56</td>
<td>1.04</td>
<td>0.455</td>
<td>3.54</td>
<td>1.28</td>
<td>0.42</td>
</tr>
</tbody>
</table>

|                          | 3102.6                      | 18.87             | 0.85       | 0.42                     | 3.2          | 1.07        | 0.41                        |

*Concentrated protein (Belgian origin), each kilogram contains: 2200 kcal/kg metabolized energy, 40% crude
protein, 8% fat, 3.5% fiber, 25% ash, 8% calcium, 3.1 phosphorus availability, 1.2% lysine, 1.2% Methionine, 1.8%
Methionine + 70 mg, 30 mg Vitamin B1, 300 mg Vitamin E, 2500 IU D3, Cysteine A, 2% Chlorine, 10,000 IU 12 mg Folic Acid, 250 mg B12, B 12 10 mg Pantothenic acid, 400. mg niacin, 50 mg vitamin B2, 5000 mg Choline chloride, 450 mg iron, 70 mg copper, 600 mg, C 600 mcg biotin, 1000 mg special vitamin, 750 manganese, 5 mg iodine, 1 g cobalt and antioxidants. ** chemical composition was calculated according to analysis of feed materials mentioned in (NRC, 1994).

Results and Discussion

Table 2 shows the results of the statistical analysis of the effect of adding different levels of lemon grass leaf powder to the diet and its extract to drinking water on the quality characteristics of the carcass of broiler chickens for 35 days.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Live Weight - gm</th>
<th>Carcass weight - gm</th>
<th>dressing percentage</th>
<th>Breast %</th>
<th>Thigh%</th>
<th>Neck%</th>
<th>Wing%</th>
<th>back%</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>2246.67 ±29.48</td>
<td>1645.00±21.79</td>
<td>73.21±0.75</td>
<td>27.74±1.21</td>
<td>37.71±0.44</td>
<td>10.01±0.24</td>
<td>5.44±0.20</td>
<td>17.4±31.56</td>
</tr>
<tr>
<td>Second</td>
<td>2371.67±24.55</td>
<td>1764.00±18.14</td>
<td>74.37±1.18</td>
<td>26.94±1.15</td>
<td>37.79±0.76</td>
<td>10.10±0.10</td>
<td>4.78±0.27</td>
<td>18.92±0.50</td>
</tr>
<tr>
<td>Third</td>
<td>2383.33±10.13</td>
<td>1786.67±7.26</td>
<td>74.96±0.06</td>
<td>28.04±0.20</td>
<td>40.42±0.29</td>
<td>9.37±0.47</td>
<td>4.85±0.07</td>
<td>16.15±0.38</td>
</tr>
<tr>
<td>Fourth</td>
<td>2449.00±16.25</td>
<td>1846.00±16.86</td>
<td>75.37±0.27</td>
<td>28.33±1.03</td>
<td>37.70±2.31</td>
<td>9.71±0.54</td>
<td>6.67±1.25</td>
<td>16.56±1.85</td>
</tr>
<tr>
<td>Fifth</td>
<td>2486.33±17.53</td>
<td>1871.67±29.20</td>
<td>75.27±0.68</td>
<td>29.03±0.46</td>
<td>38.51±1.45</td>
<td>8.85±0.87</td>
<td>4.70±0.21</td>
<td>17.74±0.67</td>
</tr>
<tr>
<td>Significant level</td>
<td>*</td>
<td>a</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

Averages with different letters within a single column are significantly different. * (P≤0.05): NS: not significant.

First treatment: control group free from any addition. The second treatment: a basic feed added to 10 g of lemon grass / kg feed, the third treatment: a basic feed added with 20 g of lemon grass / kg feed, The fourth treatment: adding 100 ml of the aqueous extract of the lemongrass / liter of drinking water, and the fifth treatment: adding 200 ml of the aqueous extract of the lemongrass liter of drinking water.

Table 3, The effect of adding different levels of lemongrass to the diet and its extract to drinking water on the average relative weights of the edible internal organs (heart, liver and gizzard), as it showed that there were no significant differences between all Treatments birds in the relative weight of each of (heart, Liver and gizzard).
### Table 3: Effect of adding different levels of Lemon grass leaves Cymbopogon citratus to the diet and its extract in drinking water on the average relative weights of the eating giblets of broiler at 35 days

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Heart%</th>
<th>Liver%</th>
<th>Gizzard%</th>
</tr>
</thead>
<tbody>
<tr>
<td>First treatment</td>
<td>0.41±0.03</td>
<td>2.54±0.03</td>
<td>1.23±0.01</td>
</tr>
<tr>
<td>Second treatment</td>
<td>0.41±0.02</td>
<td>2.38±0.19</td>
<td>1.19±0.06</td>
</tr>
<tr>
<td>Third treatment</td>
<td>0.46±0.02</td>
<td>2.26±0.21</td>
<td>1.18±0.11</td>
</tr>
<tr>
<td>Fourth treatment</td>
<td>0.39±0.01</td>
<td>2.55±0.35</td>
<td>1.14±0.06</td>
</tr>
<tr>
<td>Fifth treatment</td>
<td>0.43±0.00</td>
<td>2.51±0.03</td>
<td>1.20±0.08</td>
</tr>
<tr>
<td>Significant level</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

NS: not significant. First treatment: control group free from any addition. The second treatment: a basic feed added to 10 g of lemon grass / kg feed, the third treatment: a basic feed added with 20 g of lemon grass / kg feed, the fourth treatment: adding 100 ml of the aqueous extract of the lemongrass / liter of drinking water, and the fifth treatment: adding 200 ml of the aqueous extract of the lemongrass liter of drinking water.

It is also evident from Table (2) regarding the significant superiority in live body weight before slaughter and carcass weight for treatments of lemon grass leaves and the its aqueous extract, mainly due to the higher live weight of them, which was then reflected in body weight before slaughter and the carcass weight.

### References


