The effect of adding flour purslane (*Portulaca oleracea* L.) in the ration on meat chemical composition of broiler chickens

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Abstract. The purpose of the research was to determine the Effect of purslane flour in the ration on the meat chemical composition of broiler chicken. 100-day old chicks broiler used in the experiment, and the study used a completely randomized design (CRD) with four treatments and 5 replicates. The four treatments were: (1) \(T_0\): commercial ration; (2) \(T_1\): commercial ration + 2.5\% purslane flour; (3) \(T_2\): commercial ration + 5\% purslane flour; and (4) \(T_3\): commercial ration + 7.5\% purslane flour. Parameter measured were water, protein, and fat content of broiler meat. Data obtained by cutting 60 chickens from which 15 chicken from each treatment. Statistical analysis showed that the addition of purslane flour in ration did not have significant Effect \((P > 0.05)\) on water content, but had very significant Effect \((P < 0.01)\) on protein and fat content of broiler chicken meat. It can be concluded that purslane flour added to basal ration up to 7.5\% of broiler chickens could improve the quality of broiler’s meat.

1. Introduction
Broiler chicken meat is one of the livestock products that are known to be high in fat and cholesterol. The accumulation of fat and cholesterol tends to increase with the increasing weight of broiler chickens. High levels of fat and cholesterol in broiler chicken meat can cause various diseases in consumers, especially related to high cholesterol levels [1]. However, the addition of purslane (*Portulaca oleracea* L. – Figures 1 – 2) flour in the diets of broiler chickens can increase feed consumption, body weight, daily weight gain, and can reduce the abdominal fat weight of broiler chickens [2,3,4].
Feed intake and body weight gain of broiler chickens were increased with the inclusion of 1% and 2% purslane powder in broiler diet in growing and overall periods [5]. The ration added with portulaca flour can reduce total cholesterol concentration and improve the ratio of omega 6 : omega 3 in the
meat of broiler chickens [1]. The objective of the present study was to confirm previous works on dietary supplementation of purslane in the ration higher than 2.5% - 7.5% on meat chemical composition of broiler chickens.

2. Materials and methods

2.1. Experimental birds and management of experimental diets

100-day old chicks of broiler strain CP 707 were divided into four groups of sixteen birds, which were sub-divided into five replicates of four birds/treatment. They were randomly assigned to any of the four diets in a completely randomized design experiment. The four treatments used in this experiment were: (1) T0: commercial ration; (2) T1: commercial ration + 2.5% purslane flour; (3) T2: commercial ration + 5% purslane flour; and (4) T3: commercial ration + 7.5% purslane flour. The composition of the complete diets supplied by PT Charoen Pokphan fed to finisher broiler chickens is presented in Table 1. Feed and water were offered ad libitum.

Table 1. Composition of complete diets CP-11-12 and Portulaca oleracea L fed to broiler chickens

|                  | Complete diet  | Portulaca oleracea L |
|------------------|----------------|----------------------|
|                  | C-11           | C-12                 |
| Dry matter (%)   | 91.99          | 88.9                 |
| Organic matter (%)| 92.08          | 90.39                |
| Crude Protein (%)| 19.33          | 18.53                |
| Crude Fat (%)    | 5.03           | 4.89                 |
| Crude Fibre (%)  | 4.83           | 5.48                 |
| Total Carbohydrate (%) | 67.72      | 66.97                |
| Ether Extract (%)| 62.88          | 61.49                |
| Energy (MJ/Kg)   | 18.12          | 17.74                |
| Energy (Kkal/Kg) | 4,313.52       | 4,225.00             |

2.2. Data collection and analysis

The variables observed in this study were the percentage of the chemical composition of chicken meat, including protein, fat, and water [7]. Analysis of meat protein levels using the Kjeldahl-micro method and fat content using the Soxhlet Extraction Method and analysis of water content of chicken meat levels using the thermogravimetric method [6]. Data that were collected were subjected to ANOVA's procedures [8].

3. Results and discussion

The results showed that the treatments yielded a significant difference (P <0.05) on meat protein content (Table 1). This means that the addition of purslane flour in feed influences the level of meat protein. The higher the level of addition of purslane flour, the higher the protein content of the meat. Meat protein levels in the study ranged from 21.19 - 24.35%. The results of this study higher than [8], who reported that meat contained about 19-23% protein. The protein content of 6 weeks old broiler breast meat ranged from 19.68 - 23.76. This difference is thought to be caused by the quality of the protein contained in purslane flour. In general, the protein content of most meat (including poultry meat) ranges between 15 and 35%, depending on the water and fat content of the product [9].

The results of the analysis of variance showed that the treatment showed a very significant difference (P <0.01) of the fat content of the meat. This indicates that the addition of purslane flour in the diet affects the level of meat fat. The results of the study showed that the higher the level of addition, the lower the level of meat fat. The results of this study are within the range of recommended by [9] that the fat content of meat ranges from 1.49 to 1.91%. The addition of purslane...
flour at the level of 7.5% showed a decrease in meat fat content that is very good, which is lower than the recommended by [9] that 1.86% vs. 1.91%. This result is quite promising for consumers who are concerned about cholesterol levels in their blood. The results of the analysis of variance showed that the administration of purslane flour did not significantly affect the water content of meat (P>0.05). This is caused by the same fat content of meat in each treatment. Meat water content is related to fat content. The breakdown of fat in the body besides producing energy also produces carbon dioxide and water. Meat water content in this study ranged from 73.75 - 75.03% is still in the normal range reported by [9] that meat water intake is around 75% within the range of 65 - 80%.

Table 2. The Effect of treatments on protein, fat, and water contents of the meat broiler chickens (%)

| (1) Protein | Treatments | | | |
|-------------|------------|---|---|---|
| Replicates  | T_0        | T_1 | T_2 | T_3 |
| I           | 19.3       | 20.17 | 23.53 | 25.41 |
| II          | 21.34      | 21.41 | 22.85 | 23.69 |
| III         | 22.21      | 22.19 | 23.25 | 22.88 |
| IV          | 19.86      | 19.16 | 24.37 | 24.89 |
| V           | 23.25      | 25.06 | 24.02 | 24.9  |
| Mean        | 21.19^a    | 21.60^b | 23.61^bc | 24.35^c |

| (2) Fat | Treatments | | | |
|----------|------------|---|---|---|
| Replicates | T_0 | T_1 | T_2 | T_3 |
| I         | 2.9 | 2.75 | 1.78 | 1.77 |
| II        | 03.25 | 2.8 | 02.23 | 2.07 |
| III       | 03.18 | 2.53 | 2.04 | 1.81 |
| IV        | 2.43 | 2.13 | 2.51 | 2.24 |
| V         | 2.55 | 2.73 | 2.4 | 1.42 |
| Mean      | 2.86^a | 2.59^bc | 2.21^c | 1.86^c |

| (3) Water | Treatments | | | |
|-----------|------------|---|---|---|
| Replicates | T_0 | T_1 | T_2 | T_3 |
| I         | 74.63 | 75.6 | 73.95 | 73.05 |
| II        | 74.39 | 74.12 | 74.73 | 75.04 |
| III       | 73.8 | 75.64 | 74.53 | 74.3 |
| IV        | 75.67 | 77.62 | 73.81 | 73.45 |
| V         | 74.37 | 72.17 | 73.99 | 72.91 |
| Mean      | 74.57^a | 75.03^a | 74.20^a | 73.75a |

Note: Means with different superscript within a column are significantly different (P<0.05)

4. Conclusion

Purslane flour added to basal ration up to 7.5% for broiler chickens could improve the quality of broiler’s meat.

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