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ORIGINAL ARTICLE

Survey of Ascite Syndrome Prevalence on Ross Broilers Treated with Peppermint Extraction (*Mentha Piperita*)

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ABSTRACT

Ascite syndrome is referred to aggregation of non-inflammatory fluid in abdominal cavity. In other words, ascite is accumulation of non-inflammatory transudate fluid in one of the eight body cavities. Ascite syndrome is one of the Primary causes of death in broiler with rapid growth that results in economic losses. This syndrome caused economic losses in poultry industry because this syndrome involves most fat and beefy chickens. The aim of this study was to survey of ascite syndrome prevalence on Ross broilers treated with peppermint extraction. In this study, 300 broiler ROSS chicks divided into two groups. Each groups allocated into three replications and each replication contained 50 mentioned chicks. Group A considered as treatment (received peppermint extraction) and group B considered as control (not-received peppermint extraction) group. By comparison of data obtained from sum of both groups mortality revealed that there is a significant difference between two groups ($p < 0.05$). With consideration of all references revealed that peppermint has antimicrobial and surface tension depressant effects that all of these can increase pulmonary capacity and subsequent increase in absorption of environmental oxygen and minimizing the hypoxia. Finally, peppermint extraction is effective in prevention of ascite syndrome.

Key words: Ascite syndrome, ROSS, broiler chicks, peppermint extraction.

Introduction

Ascite syndrome is referred to aggregation of non-inflammatory fluid in abdominal cavity. In other words, ascite is accumulation of non-inflammatory transudate fluid in one of the eight body cavities [1,6]. The origin of this fluid is blood plasma from the saturated organs and tissues, especially the liver. This Syndrome in broiler chickens with a high incidence is seen, but a state with similar changes in liver and heart of broiler ducks and commercial turkey meat has been reported as rare. Recently, this syndrome called pulmonary hypertension syndrome. The prevalence rate in broiler chicks is approximately 4.7%. Reaction between environmental and genetic

factors plays a substantial role in its progress [4]. Mortality rate in normal conditions vary from 1-30% and the specific geographical conditions like a cold and hypoxic plateaus also increased. Ascite syndrome is a metabolic disorder in which losses is over 25% of total mortality, which creates losses in five to six weeks of the growing period, period which considered as important phase of life.

Although, its etiologic agent can be begins early [16,17]. Ascite syndrome is one of the Primary causes of death in broiler with rapid growth that results in economic losses.

This syndrome caused economic losses in poultry industry because this syndrome involves most fat and beefy chickens [10].

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In this disease, many blood parameters changed such as Hemoglobin, hematocrit, RBC and WBC count, Erythropoietin, MCV and MCH. In patients' blood, the levels of neutrophils and monocytes are higher than lymphocytes. Plasma level in suffered chickens is same with healthy chickens however HCT obviously in suffered birds increased and thus increase the blood volume in ascitic chickens. Increase in PCV is due to obvious increase in blood cells which is accompanied with increase in hemoglobin concentration [13,14]. Peppermint is used widely in medicine and food industries. This drug detected as safe in FDA list and its plant has low side effects but its oils can be causes heartburn, colitis and cholecystitis. Of peppermint use in traditional medicine can be refer to diminish of colitis and gases in neonates and digestive disorders such as vomiting, bloat and intestinal worms [2]. The aim of this study was to evaluate of peppermint 20% extract effect in decreasing of ascite syndrome incidence in broiler chicks. So far no study that shows the reduced incidence of ascite syndrome subsequent peppermint oil consumption and there is no source in peppermint oil efficiency in controlling the occurrence of ascite thus this study is a newly work. But the effect of peppermint oil in respiratory diseases and its antimicrobial effects are presented [7,8,9].

Materials and methods

In this study, 300 broiler ROSS chicks divided into two A and B groups. Each groups allocated into three replications and each replication contained 50 mentioned chicks. Group A considered as treatment and group B considered as control group. Chicks were nurtured in standard cages.

To maximizing the chicks sensitivity to ascite syndrome used of 15 pieces in cubic meter. Salon temperature in two first days was 32°C following by gradual decrease 1°C per 3 days and finally was fixed in 20-22°C to slaughter.

Bed humanity in first week by spraying water reached to 40-50% and then fixed in 30-35%. Salon ventilation was same to both groups. Light program in first week was 24h light with 20 LUX intensity and then fixed in same intensity with 23h light and 1h blackout to slaughter.

After ten days of study, peppermint 20% extract administrated to group A chicks at dose of 200^{cc} per 1000 Lit for 12h per day. Group B chicks not received peppermint extract. The Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA), version 17.0, was used for statistical analysis. In this study used of t-test to comparison of data obtained among both groups. P<0.05 was considered statistically significant.

Table 1: Comparison of mortality rate in end of each week in both groups.

| Age (week) group | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Sum | % | p-value |
|------------------|---|---|---|---|---|---|---|-----|-----|---------|
| A (treatment) | 2 | - | - | 2 | 1 | 2 | 2 | 9 | 6 | 0.004 |
| B (control) | 2 | - | - | 1 | 2 | 5 | 4 | 14 | 9.3 | |

Table 2: Comparison of mortality rate due to ascite syndrome in end of each week in both groups.

| Age (week) group | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Sum | % | p-value |
|------------------|---|---|---|---|---|---|---|-----|------|---------|
| A (treatment) | - | - | - | 1 | - | 2 | 2 | 5 | 3.3 | 0.008 |
| B (control) | - | - | 1 | 1 | 3 | 2 | 2 | 9 | 6.06 | |

Table 3: Comparison of mortality rate due to colibacillosis in end of each week in both groups.

| Age (week) group | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Sum | % | p-value |
|------------------|---|---|---|---|---|---|---|-----|-----|---------|
| A (treatment) | - | - | 1 | 1 | 1 | 2 | 3 | 7 | 4.6 | 0.021 |
| B (control) | - | - | 2 | 2 | 1 | 2 | 4 | 11 | 7.3 | |

Results:

After measurement of mentioned parameters such as weekly losses rate, total losses rate, losses due to ascite, body weight mean, feed conversion ratio, feed intake, and hematocrit percent, data obtained were analyzed and following results were achieved (table 1).

By comparison of data obtained from sum of both groups mortality revealed that there is a significant difference between two groups (p<0.05). Remember that losses in first week was related to yellow sac infections and according to bacterial cultures, the type of genera was detected E.coli. Necropsy of loosed chicks in next week's was related to ascite syndrome and colibacillosis and in some cases both disorder was cleared (table 2 and 3).

From losses aspect due to ascite syndrome, there is a statistical difference between two groups (p<0.05) and minimized losses in treatment group was obvious.

Remember that necropsy evidences are hydropericardium, heart dilatation, muscles and intestine hyperemia, accumulation of transudate fluid contained fibrin in abdominal cavity and liver edematous.

Discussion:

Ascite is one of the non-infective poultry diseases in world [4]. In our country because of inappropriate and bad management conditions its prevalence is very high and losses due it reported in high levels.

According to obtained data from 18 countries of 4 continents revealed that this syndrome loss is about 4.7% [11]. This syndrome is multi-reason and of its origins can be refer to endogen and exogen agents [10]. Of its important causes can be referring to imbalance between required and existed oxygen [4]. Oxygen deficiency consequent several factors such as low temperature, existence of Cartilaginous and bony nodules in lungs and pulmonary disease such as bronchitis, mycoplasmosis, colibacillosis and aspergillosis, rapid growth, height, poisoning, inappropriate ventilation [6]. However, this syndrome can be appear after disease such as CRD complex and infective bronchitis as a result of complication [4]. In general, ascitic losses in broilers are as a result of pulmonary hypertension that results into tachycardia and heart hypertrophy and finally ascite. Pellets feed increased intake of energy per unit time, which results in increased requests for oxygen to high metabolism and high density is caused hypoxia [3,5].

Rechelmann showed that peppermint extraction has anti cough and nasal decongestant effects which are causes to decrease in surface tension of synthetic surfactant that can reduce pulmonary surface tension. Also demonstrated that use of peppermint essential oils result in destruction of airways discharges. Also demonstrated that use of peppermint essential oils result in decreasing of mucosal hypertrophy, losses of goblet cell and mucosal accumulations in trachea and minimizing the neutrophils infiltration. All above mentioned remarks causes increase in animal protectivity against secondary respiratory infections [8].

According to other researches, peppermint extraction has antimicrobial effects against *E.coli*, *Clostridium perfringens*, *Lactobacillus bulgaricus*, and *Streptococcus thermophilus* [12,15]. With consideration of above mentioned references revealed that peppermint has antimicrobial and surface tension depressant effects that all of these can increase pulmonary capacity and subsequent increase in absorption of environmental oxygen and minimizing the hypoxia.

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