COMPARATIVE EFFICACY OF YUCCA SCHIDIGERA EXTRACT AND FRUSEMIDE IN ASCITES OF BROILER CHICKS, UNDER FIELD CONDITIONS

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Abstract: Ascites is a condition with excess amount of ascitic fluid in the abdominal cavity. This study was conducted to evaluate the comparative efficacy of “Yucca schidigera” extract and “frusemide” in ascites of broiler chicks. Fifty broiler flocks affected from ascites were selected. From each broiler flock, one hundred and fifty birds were randomly selected and were divided into three groups A, B and C containing fifty birds in each group. The chicks of group “A” were given “Yucca schidigera” extract (1ml per 20L) and chicks of group “B” were given “frusemide” (1gm per liter), in drinking water for three days, while chicks of group “C” served as control. Feed intake, water intake, weight gain and reduction in amount of ascitic fluid were recorded before and after the treatment. “Yucca schidigera” treated birds gave better performance than “frusemide” treated as well as “control” group. From this study, it maybe concluded that the use of “Yucca schidigera” extract in ascites of broiler chicks is a better choice than frusemide.

Keywords: Ascites, broiler, frusemide, Yucca schidigera.

INTRODUCTION

Poultry industry is playing an important role in meeting animal protein requirements. Different diseases as well as managerial problems are major constrains in its development. Ascites is a condition that plays an important role in increasing poultry losses. In the World Broiler Ascites Survey [Maxwell and Robertson 1971], information on 18 countries from four continents showed that ascites affects 4.7% of live broilers worldwide. In Pakistan, ascites has been recorded in number of poultry farms with mortality reaching to 22.5% [Ahmad et al. 1986]. This increase coincides with ongoing genetic and nutritional improvements in the areas of growth rate and feed efficiency [Julian et al. 1986].

Ascites is a condition in which excess amount of ascitic fluid (a combination of lymph and blood plasma which has leaked from the liver) accumulates in the body cavity. Ascites in poultry is a type of congestive heart failure, which is also known as pulmonary hypertension syndrome. Ascites syndrome is associated with abnormally high blood pressure between heart and lungs (pulmonary hypertension) leading to right heart failure, increased blood pressure in the veins and excessive buildup of fluid in liver (passive liver congestion), which leaks into the body cavity,
leading to the common name of disease, “water belly”. Selection for rapid growth and efficient feed conversion in broilers has resulted in such a high rate of metabolism that its heart and lungs are barely capable of providing enough oxygen to sustain the body [Julian 1990]. Ascites is a metabolic disorder and several factors are known to influence the occurrence of ascites in broilers [Julian 1990, Schelle 1993]. At present different methods; like feed restriction [Albers et al. 1990, Classen et al. 1991, Shlosberg et al. 1991, Arce et al., 1992, Schelle 1993], use of antitoxin and diuretics [D’Amico et al. 1986, Gines et al. 1987, Stanley et al. 1989, Runyon 1994, Caldwell and Battle 1999] are used to control ascites.

In Pakistan, poultry industry is still in its developing stage; therefore, more research would have to be conducted in order to fully determine the real utility of different drugs. The present study was therefore undertaken to study the comparative efficacy of “Yucca schidigera” extract and “frusemide”, which are herbal and allopathic medicines respectively, as a treatment of ascites in broiler chicks under field conditions. Effects of these drugs on feed intake, water intake and weight gain of experimental birds were also studied.

**MATERIALS AND METHODS**

**ISOLATION OF EXPERIMENTAL BIRDS**

In order to perform the present study, eighty five flocks affected from ascites were visited and out of them fifty flocks were selected. From each affected flock, one hundred and eighty ascitic birds were isolated on the basis of clinical signs e.g. cyanosis of comb and wattles, gurgling sounds, distended abdomen (Fig. 1) reduce exercise tolerance [Julian 1993]). Ascitic birds were randomly divided into three groups A, B and C, containing sixty birds in each group. To confirm the diagnosis by postmortem lesions (panting of breast muscle, swollen and congested liver, enlarged and flabby heart, dilated right ventricle, abundance of ascitic fluid (Fig. 2), pale and grayish lungs [Leeson et al. 1995], ten birds from each group were slaughtered, leaving fifty birds in each group.

![Fig. 1](image1.png)  ![Fig. 2](image2.png)

**Fig. 1:** An ascitic broiler carcass with excessive accumulation of fluid in the body cavity.  
**Fig. 2:** Open abdominal cavity of an ascitic broiler chicken. Note the enlarged heart and the abundance of ascetic fluid.
PARACENTESIS
This diagnostic test was performed on ten slaughtered birds from each group, to evaluate the amount of ascitic fluid in the body of ascitic birds. Test was carried out by insertion of a needle, attached to a syringe, through the abdominal cavity of affected bird and filling up of syringe by negative pressure created by pulling the handle of syringe in backward direction.

HOUSING
The chicks of each group were kept under deep litter system using fresh dry sawdust litter material in individual pens. The size of pens was such that it provided 1.2 square feet floor space per chick. The affected birds were reared at room temperature (25°C). Twenty-four hours light was provided to all the experimental birds. The birds were fed ad libitum.

DRUGS
1) Norponin-200 that contained “Yucca schidigera” (200 mg), was provided to the ascitic birds of group “A” at dose rate of 1ml/ 20 liters of drinking water for three days (as recommended by manufacturer).
2) Frusicon that contained “frusemide” (200mg), was provided to the ascitic birds of group “B” at a dose rate of 1gm/liter of drinking water for three days (as recommended by manufacturer). The ascitic birds of group “C” were not treated and served as control.

OBSERVATIONS
The following observations were recorded during the conduction of experiment:
(1) Feed Intake     (2) Water Intake
(3) Weight gain     (4) Reduction of ascitic fluid

STATISTICAL ANALYSIS
The experiment was conducted according to “complete randomized design”. The recorded data of feed intake, water intake, weight gain and reduction of ascitic fluid was subjected to analysis of variance and “least significant difference” was also applied to the recorded data [Sokal and Rohlf 1995].

RESULTS
DAILY FEED INTAKE OF EXPERIMENTAL BIRDS
In group “A” daily feed intake was 113.9gm ± 12.8gm per day and it ranged from 95gm-135gm per day. In group “B” it was 104.6gm ± 11.92gm per day and it ranged from 90gm-125gm per day. In group “C” it was 95.25gm ± 12.08gm per day and it ranged from 80gm-120gm per day. Statistically, the amount of daily feed intake in the group “B” was significantly better (P<0.05) than group “C”. The difference in amount of
feed intake of group “A” and group “C” was highly significant (P<0.01). Similarly, the difference between amount of daily feed intake in the treatment group “A” and “B” was also significant (P<0.05) as shown in Fig. 3.

**Fig. 3**: Daily feed intake (gm) per bird in experimental flocks.

**Fig. 4**: Daily water intake (ml) per bird in experimental flocks.

**DAILY WATER INTAKE OF EXPERIMENTAL BIRDS**

In group “A” daily water intake was 227.8ml ± 25.7ml per day and it ranged from 190ml-270ml per day. In group “B” it was 209.25ml ± 23.85ml per day and it ranged from 180ml-250ml per day. In group “C” it was 190.5ml ± 24.16ml per day and it ranged from 160ml-240ml per day. Statistically, the amount of water intake in the group “A” was significantly better (P<0.05) than group “C”. Similarly, the difference in amount of water intake of group “A” and group “C” was highly significant (P<0.01). The difference in amount of water intake between the treatment group “B” and “C” was non significant (P>0.05) as shown in Fig. 4.

**WEIGHTS OF EXPERIMENTAL BIRDS**

At the end of experiment, average weight of the birds in group “A” was 1035gm ± 171.5gm and it ranged from 800gm-1270gm. In group “B” it was 780gm ± 164.6gm and it ranged from 600gm-960gm. In group “C” it was 775gm ± 155.62gm and it ranged from 600gm-950gm. Statistically, the difference in the weights of group “A” and group “B” was significant (P<0.05). Similarly, the difference in amount of weight gain between group “A” and group “C” was highly significant (P<0.01). The differences in weight gain between treatment groups “B” and “C” was non significant (P>0.05) as shown in Fig. 5.

**REDUCTION OF ASCITIC FLUID OF EXPERIMENTAL BIRDS**

At the end of experiment, all experimental birds were slaughtered to measure the amount of ascitic fluid by paracentesis. The reduction in amount of ascitic fluid in group “A” was 9.65ml ± 1.13ml and it ranged
from 8.5ml-10.8ml. In group “B” it was 10.45ml ± 0.92ml and it ranged from 9ml-11.8ml. In group “C” it was 1.09ml ± 0.12ml and it ranged from 1ml-1.4ml. Statistically, the difference in reduction of ascitic fluid between group “A” and group “B” was non significant (P>0.05). The difference in amount of reduction of ascitic fluid of group “A” and group “C” was significant (P<0.05). Similarly, the difference in amount of reduction of ascitic fluid in group “B” and “C” was highly significant (P<0.05) as shown in Fig. 6.

**Fig. 5:** Weight gain (gm) per bird in experimental flocks.
**Fig. 6:** Reduction of ascitic fluid (ml) in experimental birds.

**DISCUSSION**

Ascitic syndrome is characterized mainly by hypoxemia, followed by a cascade of events: increased cardiac output; development of pulmonary hypertension; right ventricle hypertrophy; right heart valve insufficiency; central venous congestion; fluid exudation, mainly to the peritoneal cavity and pericardium; and finally death [Maxwell et al. 1990, Julian 1993, Maxwell et al. 1995, Julian 1998, Olkowski and Classen 1998]. At present, different managemental as well as therapeutical measures are used to control ascites of broiler chicks. *Yucca schidigera* is an endemic plant and occurs from coastal southern California and northern Mexico eastward into northwestern Arizona and southern Nevada [Wallace and Romney 1972, Keeley et al. 1985]. Yucca extracts are sold as herbal products within the nutraceutical industry for its purported benefits in ascites. Frusemide is a loop diuretic that works by encouraging the kidneys to filter out more sodium and potassium, drawing more water with them, relieving symptoms of fluid overload.

In this experiment we evaluated the comparative efficacy of “*Yucca schidigera*” extract and “frusemide”, in ascites of broiler chicks. The result indicated that the difference in amount of feed intake between “*Yucca schidigera*” treated group and “frusemide” treated group was significant (P< 0.05) which is in accordance to the previously reported study by Korol et al. [1995]. The difference in amount of water intake between “*Yucca
“Yucca schidigera” treated group and “frusemide” treated group was also significant (P< 0.05). Similarly, the difference in body weights between “Yucca schidigera” treated group and “frusemide” treated group was significant (P< 0.05) but the difference in reduction of ascitic fluid between “Yucca schidigera” treated group and “frusemide” treated group was non significant (P>0.05).

In “Yucca schidigera” treated birds, feed intake, water intake and weight gain was significantly better than that of “frusemide” treated birds. The difference in amount of reduction of ascitic fluid between “Yucca schidigera” treated birds and “frusemide” treated birds was non significant. This study indicates that “Yucca schidigera” extract is helpful in increasing feed intake, water intake, weight gain as well as reduction of ascitic fluid. From this, it might be concluded that use of “Yucca schidigera” extract in ascites of broiler chicks is a better choice than frusemide.

References


