Effectiveness Of Aloe Excelsa In Controlling Coccidiosis In Broilers

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Abstract

The objective of the study was to investigate the technical effectiveness of using A. Excelsa in controlling coccidiosis in broilers. Birds were housed in cages constructed out of wire mesh and metal poles. The cages were divided into four compartments with ten birds in each cage of 1 m^2 floor and feeding area. Litter of wood shavings and grass was put in the cages as bedding. Feeders and drinkers were tightly secured in each cage to avoid spillage during feeding. The birds were fed ad libitum broiler starter and finisher mash from day old to four weeks and five weeks to eight weeks, respectively. Droppings from birds infected by coccidiosis were introduced in the drinking water of the treatment group during the third week. Twenty birds infected with coccidiosis were dosed with aloe powder mixed in drinking water at 0.8g aloe per ten birds, over a period of two weeks. Another batch of twenty birds infected with coccidiosis was dosed with sulphachlopyrazine sodium monohydrate (Esb3) at a rate of 15g/250 birds. After the first seven days of treatment 10 g of droppings were taken from each treatment for coccidia analysis at the Central Veterinary Laboratory in Harare. Coccidia counts before treatment was 3000 oocysts for both treatments and declined to 500 and 300 oocysts after first seven days of treatment and 100 and 50 oocysts after second seven days of treatment by ESB3 and aloe, respectively. Birds from the two treatments showed normal growth rates with no significant differences ($P>0.05$) between the two treatments in oocysts counts. Aloe Excelsa proved effective as Esb3 in the control of coccidiosis in broilers. The study showed that poultry farmers can adopt Aloe Excelsa as a low cost alternative treatment to allopathic drugs.

Introduction

Coccidiosis is a common and fatal disease in poultry, particularly those housed under deep-litter system. According to reports from Government Veterinary Laboratory Services in Harare, the disease is increasingly becoming problematic among urban and rural poultry farmers of Zimbabwe. Coccidiosis is the direct result of contamination into the intestinal walls by minute parasitic organisms called coccidian (Gordon: 1982). During their life cycle the different developmental stages of the coccidia will invade vast numbers of intestinal cells and destroy them as they feed (Suls, 1999). Whilst causes of coccidiosis can be linked directly to poor flock health management, the need to control the disease, once noticed, is inexcusable.

However farmers are constrained from controlling the disease by the inhibitory high costs of drugs and the fragmented veterinary service provision (Kusina et al, 2001). The use of aloe is believed to be cheaper and reliable though there is no documented evidence to substantiate such a claim. The objective of the study was to investigate the effectiveness of Aloe Excelsa in controlling coccidiosis broiler birds.

There are more than 360 known aloe species, but the most recommended type of aloe in controlling coccidiosis is A. Excelsa (Gundidza, 2001). The aloe drug controls coccidiosis in two ways:

i. Enhancing bowel movement, that is speeding up the discharge of coccidian in contaminated waste matter (droppings) from the intestines.
ii. Killing the spread of coccidian in the body of infected birds.

   In addition, aloe drug heals lesions created by coccidian parasites on the intestinal wall (Gundidza, 2001). However purgation may reduce food absorption with subsequent loss in body weight.

Objectives

i. To establish technical effectiveness of aloe excelsa compared to sulphachlopyrazine sodium monohydrate (Esb3), in the control of coccidiosis in Ross-Broilers.
ii. To determine the influence of Aloe drug on growth rate of broilers.

Hypothesis

Aloe Excelsa can effectively control coccidiosis in Ross broiler chickens.

Literature Review

Sustainability of Aloe Excelsa

Aloe Excelsa belongs to the lily family of plants and is ubiquitous in marginal and rocky areas of Zimbabwe that receive annual rainfall of about 500mm. The flower part of Aloe Excelsa produces sweet water liquid when in full blossom and young people suck the sugary liquid to gain energy.

The plant is believed to have several medicinal properties and is used to treat various ailments ranging from sexually transmitted diseases, burns, wounds, stomach ailments, spasms and ulcers among others. Propagation of the plant is done vegetatively from the side shoots that emerge close to the ground level. Since the plant is found in dry areas and survives under desert like conditions it helps in maintaining ecological balance by preventing soil erosion and soil compaction. Zimbabwe losses several tonnes of top soil through erosion, and conservation strategies targets use of aloe in the plugging of dongas since it's easy to establish and readily available.

A diagnostic survey carried out in three provinces of Zimbabwe namely Masvingo, Mashonaland Central and West Provinces among small scale and communal farmers showed that livestock farmers rarely resort to the orthodox veterinary medicine, but rely mainly on local knowledge and local specialists with no outside input (Bwakura, TM and Matekaire T, 2004). Traditional animal healers often share their knowledge and experiences in disease prevention and control at no cost but as an obligation to fellow community members, whereas a visit to a modern veterinary surgeon entails one incurring exorbitant costs of drugs and consultation fees.

Most farmers engage in subsistence poultry production using exotic broilers and indigenous chicken breeds, which makes the cost of procuring modern medicines prohibitive and unsustainable. Even if farmers could afford buying expensive antibiotics drugs such as ESB3, research shows that they have residual effects on human beings who may consume the meat products of such animals dosed with synthetic drugs (Masiiwa, 1999). In addition, disposal of drug containers cause serious pollution as most of them are packaged in plastics, which do not break down easily unlike traditional drugs that are less stable and less bio-cumulative. The need to explore on local remedies that are readily available, socially acceptable and demanding no external input or investment becomes inevitable.

Materials and Methods

Aloe gel was extracted from the leaf of the A. Excelsa by making a cut using a pocket- knife, the juice was allowed to drip in a glass jar. After extraction the gel was poured in a pot, heated on fire to evaporate water, and the residue was rolled into a ball and dried. The dry ball was ground into fine powder and stored in an air- tight container to avoid oxidation.

Birds were housed in cages constructed out of wire mesh and metal poles. The cages were divided into four compartments with ten birds in each cage of 1 m^2 floor and feeding area. Litter of wood shavings and grass was put in the cages as bedding. Feeders and drinkers made out of plastic containers were used i.e. one drinker and a feeder per two birds. Feeders and drinkers were tightly secured in each cage to avoid spillage during feeding. Broiler starter and finisher mash were fed to birds ad libitum from day old to four weeks and five weeks to eight weeks, respectively.

The introduction of coccidiosis started during the third week of age and proceeded for three weeks. Droppings from birds infected by coccidiosis were introduced in the drinking water.

There was also a deliberate promotion of moist conditions in cages so as to enhance coccidial attack.

Blood stained droppings were noticed in all cages during the beginning of fifth week. Treatment started during the end of fifth week. One group of birds was treated with the aloe extract and the other group was given ESB3. A 0.8 g aloe powder was used to treat ten birds in a cage for seven days. The optimal dosage rate of administering the aloe drug was based on previous research work (Gundidza, 2001). After the first seven days of treatment 10 g of droppings were taken from each treatment for coccidia analysis at the Central Veterinary Laboratory in Harare. Data was statistically analyzed using the Statistical Package for the Social Sciences (SPSS, Version 10)

Measurements

A sample of 1g of droppings was taken from each specimen, then mixed with 9.5 physiological saline, sieved in a 150 micro-mesh to remove debris and poured in test tube then centrifuge at 1.5 rpm for 5 minutes. Heavy material in the droppings settled at the bottom and any suspension was thrown away. The material that remained in the test tube was mixed with 15 ml Aluminium Nitrate and 10 % (1.5 ml) of the contents were poured on a fill chamber. The number of oocysts was counted under a microscope and the following results were observed.

Measurement of Live weight Gain

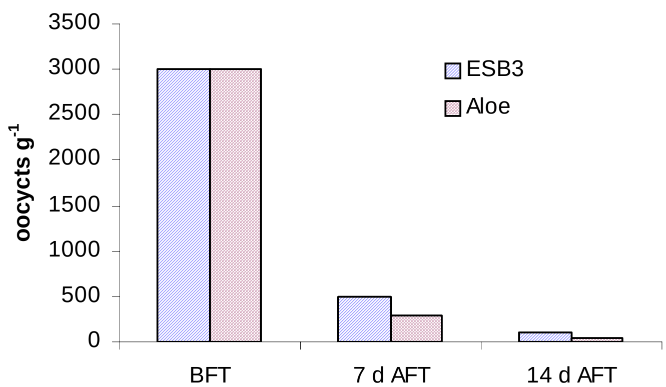
All birds from both treatments were weighed on a weekly basis using spring balance scale. The unit of measurement was kilograms. Mean weights from each replication were recorded to establish the growth rates against the expected normal growth curve of a broiler.

Results and Discussion

Figure 1 illustrates the level of coccidia in the droppings of broilers before and after treatment with either aloe or Esb3. Coccidia counts before treatment was 3 000 oocysts for both treatments, they reduced to 500 and 300 oocysts after first seven days and 100 and 50 oocysts after second seven days of Esb3 and Aloe treatment, respectively. Aloe proved just as effective as Esb3 in the control of coccidiosis ($t = 1.387$; $P < 0.05$).

The results show that the Aloe is as effective as Esb3 in the treatment of coccidiosis in Ross broiler chickens ($t = 1.387$; $P < 0.05$). However the Aloe drug seems to be more potent as shown by lower oocysts counts compared to Esb3. Differences noted in the counts of oocysts, 300 compared to 500 and 50 compared to 100, apart from error, could be attributed to the build up of resistance by the coccidian parasites due to continuous use of Esb3 as opposed to the aloe. Chapman (1999) pointed out that no single anticoccidial drug – no matter how powerful – is ever going to win the war against coccidiosis, hence the need to shuffle around varying anti coccidiosis drugs of differing chemical profiles. The other reason why the Aloe drug, compared to Esb3, seems more effective could be due to the mode of control of the two drugs.

Fig 1: The coccidia count before and after seven or fourteen days after treatment



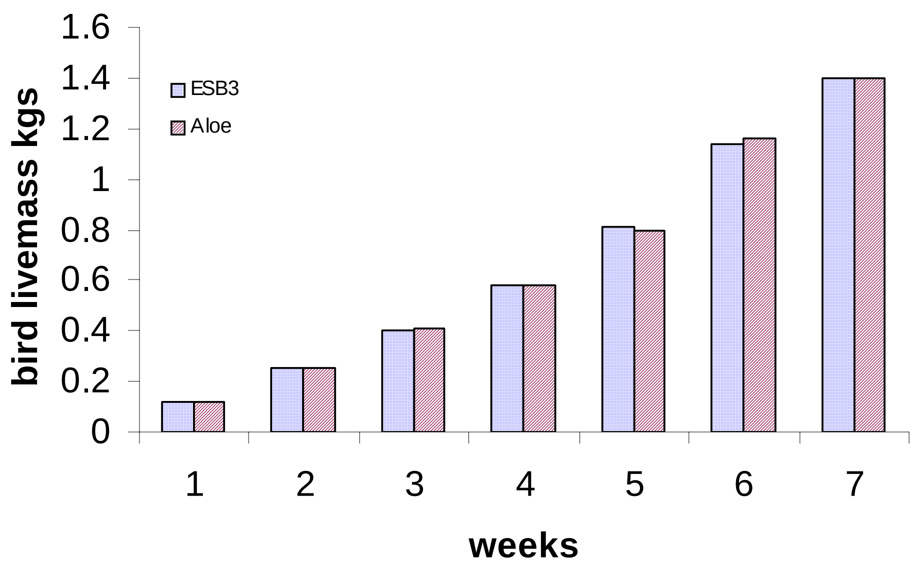
ESB3 controls coccidiosis by killing coccidia in the body of the infected bird. The Aloe extract controls coccidiosis in two ways: -

- Enhance bowel movement allowing quick discharge of coccidia lodged in droppings;
- The insecticide compound Pluridone in the Aloe is a sulphur-containing compound that enables aloe to kill coccidia in the bodies of infected birds.

The two drugs could not eradicate the coccidia parasites completely but managed to bring the infection level to a point where birds could start building immunity and resist any future infection, particularly of similar Eimeria species. In similar experiments where broilers were infected with 200 Eimeria acervulina oocysts for five consecutive days, there was immunity built-up (Suls, 1999 and Grindlay, et al, 1986).

The growth of the broilers under Aloe and Esb3 treatment over a period of seven weeks is as shown in Figure 2. Birds were however exposed to the treatment during week six and seven. Birds from the two treatments showed normal growth rates expected of broilers under commercial feeding (Fig 2). The graph shows that no major differences in weight gain were noticed in birds treated with aloe and Esb3. However when birds are affected by coccidiosis, normal weights are never fully regained during the growing period (Hofstad, 1978) because coccidian parasites are difficult to eradicate completely.

Fig 2: Live mass of birds treated with either ESB3 or Aloe



Conclusions and Recommendations

The study showed that Aloe excelsa is effective in controlling coccidiosis in broilers just as effective as ESB3 without loss in live mass by broilers. The use of aloe is affordable and financially cheaper as compared to Esb3 since aloe species are ubiquitous throughout Zimbabwe and are commonly grown as live fence around homes and nutrition gardens. However extraction of aloe juice is time consuming.

The use of indigenous animal health care systems has often been associated with sustainability. However, observations made at the Organization for Economic Cooperation and Development (OECD) workshop in the Netherlands in 2003 on technologies for sustainable farming systems, all farming systems from intensive conventional to indigenous, have potential to be locally sustainable. Sustainability largely depends on farmers' adoption of appropriate technologies and management practices in specific agro-ecological regions. Therefore conservation measures need to be applied on traditional medicines to ensure their long term availability for future generations through establishment of herbal gardens.

In Zimbabwe, Aloe Excelsa seems to be well conserved owing to its multi-medicinal and multi-purpose use such as human and animal medicinal properties, live fences, animal feeds, and ornamentals among others. Aloe plants are perennial hence can be used throughout the year. However, appropriate policy framework may have to be developed to sharpen farmers' skills in managing the Aloe plant.

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