Control of coccidiosis in poultry production

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Abstract
Coccidiosis is a parasitic disease with a huge impact in poultry production. The control of coccidiosis caused by Eimeria spp. may be done by adding on the feeding water coccidiostats or in alternative, also adding essential oil of eucalyptus and peppermint.

INTRODUCTION
Coccidiosis is a disease caused by gastrointestinal protozoa, notably different species of Eimeria spp (1,2) and parasite mainly birds (3). Parasites of the genus Eimeria belong to the phylum Apicomplexa (3), which includes a large number of mandatory intracellular protozoa. The coccidiosis infects birds of any age, though it does so with more intensity in the younger birds. Newborn are very sensible to this disease. The route of transmission of the disease is fecal-oral, and occurs when the birds ingest oocysts mainly found in contaminated water/feed and faeces (especially when wet, because moisture is necessary for these oocysts become infective). For this reason birds produced “on the ground” are more susceptible to coccidiosis (4).

LIFE CYCLE, ETIOLOGY AND THE DISEASE IN POULTRY
The life cycle is completed in a single host. The infecting form for the host is sporulated oocyst which has undergone a process called sporogony in the environment. After the ingestion together with the feed or water, this parasite of the gastrointestinal tract, causes the rupture of its membrane and the release of sporocysts and sporozoites, which are within the oocyst. The sporozoites invade the host cell, and here acquire a rounded shape called trophozoites. The cell undergoes numerous mitotic divisions, while the trophozoites become merozoite, schizont form (set of merozoites). These merozoites leave the cell and invade other, forming several generations of merozoites, which will again infect other cells or suffer differentiation to male gamonts (microgamonts) and female gamonts (macrogamonts). These gamonts leave the cells and fertilize - given rise to the zygote, which is, transformed into oocyst. Oocyst is excreted with faeces to the environment (5).

There are different species of Eimeria parasites with tropism for different areas of the gastro-intestinal tract (2), for example E. acervulina has tropism to duodenum (3), E. maxima, E. necatrix live in the jejunum, and E. tenella has tropism to cecum (5). Infected birds are ruffled, with drooping wings and take refuge in the corners. In addition, as a very characteristic symptom, they present a bloody diarrhea. Birds die in few days and the mortality is high. The ones that survive become resistant and carriers, eliminating and spreading the oocysts. Therefore agglomeration or over-populated productions favor the spread. This is a disease with a major economic impact in poultry production (4).

PREVENTION AND CONTROL OF COCCIDIOSIS
For the prevention/treatment of coccidiosis is recommended the use of coccidiostats, for example toltrazuril (1), which aims mortality reduction.Nevertheless, this should not be enough to control the disease, so there are authors studying essential oils containing eucalyptus and peppermint (2). These studies were done with birds of different ages (day) and with a control group in which the essential oil was not used. It was observed that average mortality was much lower in the groups that the essential oil was used than in those in which it has not been used. The lesions caused by Eimeria spp, particularly in the duodenum, jejunum, ileum and cecum were observed in some birds and they were not as lush in essential oil presence. Thus the results support the hypothesis using the essential oils of eucalyptus and peppermint to control Ei-
Eimeria spp. In poultry, especially broilers, thereby assisting in their production and reproduction, also contributing to the reduction of injury and in the presence of intestinal oocysts. It is also found two major parameters, the first was a very positive impact on the bare growing group using the substance described and the second is that the birds treatment with this oil is safe, having no negative impact on the production of chickens. This study also found that the addition of essential oils in feed for chickens, greatly improved its growth rate, due to more effective elimination of this disease, thus not causing intestinal lesions. Oils (eucalyptus and peppermint) are able to act as growth promoters with a coccidiostatic effect against Eimeria spp., and it was confirmed by significant improvements in feeding, reduction of mortality, through a decrease in intestinal injury and drop in intestinal oocysts counts (2). Toltrazuril is an oral solution, being effective against all species of Eimeria that infect chickens and in all development stages including schizogony and gametogony. It does not interfere with the development of natural immunity. It is also noted that salinomycin, which has been already used a few years, is becoming ineffective due to resistance of coccidiosis, emphasizing the need of replacement to toltrazuril. It was then found that treatment with toltrazuril eliminated almost completely all intestinal lesions, causing a reduction in oocysts, resulting in a good performance of chickens (1). A treatment of two days between days 6 and 18 allows parasite interaction with the host initial growth, and therefore, stimulates primary immune responses. This immunity can then be increased some time after treatment, when the new generation of oocysts settle. By this time, a balance between host and parasite should be achieved. However, performance data in 6-7 days TOL group tend to be less favorable than between 10 and 18 days. It is suggested that a window of 2 days of treatment at 10 and 14 days of life can be widely recommended for growing chickens, thereby improving the production (1).

CONCLUSIONS
The main concern in poultry production either intensive or extensive, regardless of species of birds, is the control of infectious and parasitic diseases, with a special regard for zoonoses. Thus, the past years have been checking an extreme need for drugs that eliminate the disease on farms, in order to produce more, thus having a higher economic level. Hence more studies are needed on effective molecules for this fight. After clinical signs of coccidiosis in broiler production appear, it may be too late to control the infection. Thus having an extremely importance the oil to be administered with water greatly reduces the oocyst in the gut of birds (2), thus preventing intestinal lesions and then poultry can be administered with the toltrazuril (1) which can control the schizogony and gametogony, two fundamental stages for the parasite development. Successful use of toltrazuril, as the only drug for coccidiosis control, needs to be based on some epidemiological data, accompanied by biosecurity measures and competent control (1). The use of these two substances is therefore very beneficial.

REFERENCES