

GARLIC EVALUATION (*Allium sativum*) IN TWO SUPPLY ALTERNATIVES AS AN ANTIPARASITIC IN BACKYARD HENS

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Abstract: The effect of garlic as an antiparasitic in backyard chickens was evaluated in two forms of supply: eaten and eaten. For the form taken, 5 g of garlic were ground and diluted in one liter of water and offered as the only source of drink for a period of eight days to a group of 10 free-ranging backyard hens. For the other form (food), the bulbs were fragmented with a cutter into portions of 1, 1.5 and 2g of garlic, each fragment was provided directly to the beak to a group of ten birds placed in individual cages, for a similar period of eight days. A coprological study was carried out on the hens of both forms of supply, through the flotation method, the free-ranging hens were sampled on Day 0 and 9 of the treatment, while the other groups (1, 1.5 and 2g), as well as well as the control, they were sampled on Days 0, 3, 6 and 9 of the study period. The most relevant results indicate that 100% of the sampled birds were positive for parasitosis, the parasites diagnosed were *Ascaridia galli* and *Eimeria* spp. The concentration of eggs and oocysts was reduced to 0% at the third, sixth or ninth sampling in the control group, 1 and 1.5g, respectively. Therefore, it is concluded that garlic, both crushed and loose in water, as well as the fragmented bulb, directly to the beak, was effective as a natural antiparasitic against *Eimeria* spp. and *Asaridia galli*, in Creole backyard chickens. However, in the drinking water it turned out to be the lowest dose and with less handling of the birds.

Keywords: family poultry farming, endoparasites, natural dewormers.

INTRODUCTION

All animals have parasites that have evolved to live in or on other species, each species having its own type of parasite. Domestic birds in backyard conditions are susceptible to being infested by internal parasites, by having direct contact with other domestic and wild species, as well as with their respective excreta

or their remains, so it can be ensured that very few birds will be totally free. of them (Roberts, 2015). However, the knowledge about this production system is limited, which makes its development difficult (Horta-López et al., 2021). Currently, poultry farming in general, and backyard poultry farming in particular, is significantly affected by parasitic infestations, which lead to a deficit in the performance and production of birds, with deworming being the main measure to prevent diseases (Roberts, 2015).).

Fraga et al. (1993) say that Creole birds have tolerance and adaptation to the environment, as well as resistance to various pathologies without the use of medicines, drugs, or vaccines, they register low yields but consume less food. In addition, currently attempts are being made to produce with respect for the environment in a sustainable way, reducing the use of chemical substances such as antibiotics, growth promoters, arsenicals, coccidiostats, and other dewormers, for which alternatively natural products such as garlic have been indicated (*Allium sativum*), (Cárdenas et al., 2008 and Jacob and Pescatore, 2011).

Garlic (*Allium sativum*) is native to Siberia and cultivated in Central Asia, spread by nomadic tribes, it has been cultivated and used in all cultures for more than 5,000 years. Introduced to America in the fifteenth century (Cáceres, 1996). It is a herbaceous plant with divided bulbs, about 50 cm tall. The plant produces pink to purple flowers from July to September. The bulb is odoriferous. On the basal bulb, which is covered with roots, is the main bulb around which are the so-called garlic cloves (Hall et al., 2002).

In studies carried out in calves under one year of age, the deworming effect has been observed; garlic solutions were effective for the genera *Strongyloides* spp and *Moniezia* spp (Sobalvarro, 2006). From the therapeutic point of view the main component of garlic

is allicin; This is formed when the bulb is crushed or fractured, transforming alliin into allicin by the action of the alliinase enzyme. Allicin is a sulfur compound that has various pharmacological activities of interest, its systematic name is 2-propene-1-sulfinothioic acid S-2-propenyl ester, which is used to deworm (Guimerans, 2005). This compound gives garlic its antimicrobial, antioxidant, antiparasitic, and antifungal qualities, among others. Another compound such as allylsulfide also contributes to the antiparasitic effect (Hall et al., 2002).

Another well-studied property of garlic is its anticoccidial effect; studies carried out in North Carolina (USA), demonstrated in adult goats the decrease in the parasite load of *Eimeria* oocysts, through the use of solutions of different volumes (2.5 ml, 5 ml and 10 ml); Another study carried out in 8-9 week old mice showed that the garlic solution at a dose of 20 mg/kg decreased the parasite load and the inflammation and lesions caused by *Eimeria papillata* (Worku et al., 2009). Also, the coccidiostat effect of garlic has been determined in young rabbits from 4 to 6 weeks old, inoculated with *Eimeria stiedae*, where the bulbs were crushed and administered orally, at a daily dose of 0.5 g/kg, for 5 successive days (Ashmawy, 2010).

According to Ramírez-Concepción et al. (2016) garlic contains numerous active components such as amino acids, minerals, vitamins and in smaller amounts folic acid, pantothenic acid and niacin. However, the sulfur components such as allicin, alliin, alixin, allyl methane, thiosulfinate, diallyl disulfide, diallyl trisulfide, allyl methyl trisulfinate, s-allyl mercaptocysteine, ajoene, 2-vinyl-4h-1, 2-ditiin, 5 stand out. -allylcysteine and adenosine that contribute to the beneficial effect on health. These components give garlic its antimicrobial, antioxidant, antiparasitic, and antifungal qualities.

Due to the aforementioned background, in which the conditions of the backyard poultry production system stand out, where birds are permanently exposed to infestation. As well as the antimicrobial, antioxidant, antiparasitic and antifungal qualities of garlic, in the present work the objective was to evaluate the effect of garlic as a natural antiparasitic in two forms of supply in backyard hens.

MATERIAL AND METHODS

The present investigation was carried out simultaneously in two different places, one of them in a private address of La Tenencia Morelos, belongs to the municipality of Morelia, Michoacán de Ocampo. Said Tenure is located 4.19 km (to the SW) from the geographic center of the municipality of Morelia. It is located 0.76 km (to the NE) from the center of the town of Morelos. The latitude of the zone is 19.8417, the longitude of Villa de Tenencia de Morelos is -101.7167. Postal Code 58341, in the district of Morelia (MAPAWI, 2019). The other site was in the poultry facilities of the Zootechnical Post of the Faculty of Veterinary Medicine and Zootechnics of the Michoacana University of San Nicolás de Hidalgo (FMVZ-UMSNH), km 9.5, Morelia Zinapécuaro highway, municipality of Tarímbaro, Michoacán.

The experimental stage in La Tenencia Morelos comprised a group of 10 free-ranging adult Creole hens, which underwent coprological sampling prior to the experimental stage. The feces samples were recovered directly from the floor and deposited in a numbered plastic bag, with data such as the color of the bird and a ribbon of a different color, on the left or right leg, so as to facilitate the identification of each hen. Due to management issues of free-ranging birds, sampling was carried out only at two moments: before treatment (Day 0) and on Day 9 after treatment. The samples were sent

for processing to the parasitology laboratory of the Auxiliary Services Unit for Diagnosis (USAD) of the FMVZ-UMSNH.

The experimental stage of La Posta included 40 Creole hens, acquired in localities of the municipality of Tarímbaro, Mich. and randomly subdivided into four groups of 10 individuals each, with the purpose of applying four different treatments: 10 birds with commercial dewormer, 10 with 1g of garlic, 10 with 1.5g of garlic and 10 with 2g of garlic, all were placed in individual numbered cages; A nylon bag was placed at the base of each cage to recover the excreta samples. The samplings were carried out on Days 0, 3, 6 and 9, which were collected in plastic bags marked with the cage-chicken number and transported to the same parasitology laboratory of the USAD-FMVZ-UMSNH, the laboratory technique was by the float method. Water and commercial chicken feed were offered ad libitum during the experimental stage.

The application of the garlic-based treatments were developed as follows: for the La Tenencia group, the treatment consisted of 5 g of ground garlic (liquefied) and diluted in one liter of water as the only source of drink, provided in 2 drinkers with a capacity of one liter each, consumption was left at will for 9 days, with daily replacement of water/treatment. Garlic was weighed on a scale with a precision of 0.1g. The birds of La Posta received, according to treatment, 1g, 1.5g and 2g of daily garlic directly to the beak, also during 9 Days; the garlic was cut with a cutter and weighed on a scale similar to the one indicated above. The control group received a single dose, orally, as indicated in the drug dosage.

With the results obtained, a database was created in Excel and later they were processed through descriptive statistics to evaluate averages, deviations and frequency of the diagnosed parasites. To determine the effect

of the treatment, an analysis of variance was carried out with the statistical package SAS, for the comparison of means the Duncan test was used with a significance level of 0.05. Finally, the results were condensed into tables and graphs for further data analysis.

RESULTS AND DISCUSSION

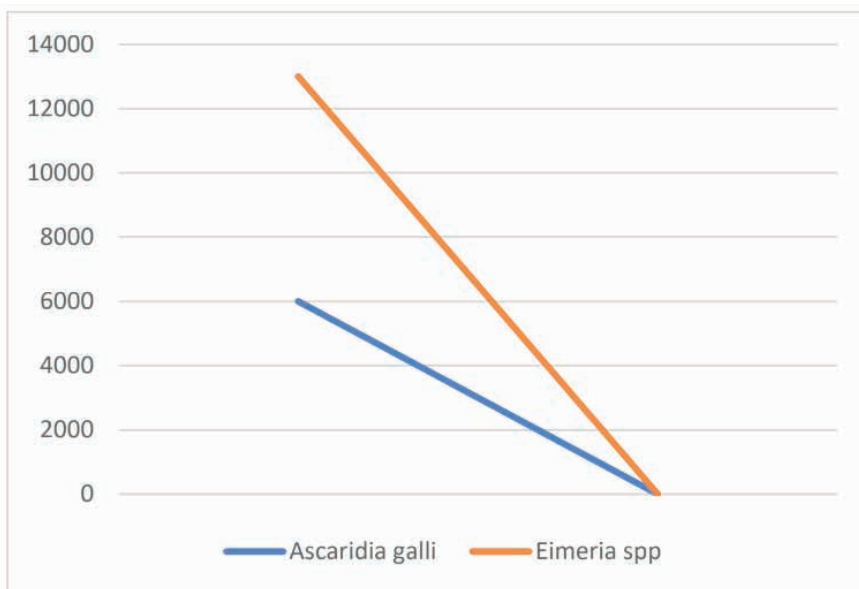
The results indicate that 100% of the hens sampled in all the treatments were infested with some parasite. The two parasites diagnosed were: *Eimeria* spp., with a frequency of 68.4% and *Ascaridia galli*, 31.5% for the birds of `La Tenencia` and `*Eimeria* spp.`, 57.3% and `*Ascaridia galli*`, 42.7% for Posta samples. 87% of the copros showed both parasites and only 17% had one of the two specimens diagnosed. These results coincide with the findings of Cárdenas et al. (2008), mainly in the proportions, perhaps because they worked with birds from the same region, the Posta region.

The results in Table 1 show the difference between the population of parasite eggs and oocyst, before and 9 days after treatment, which shows the effect of garlic as an antiparasitic, in that dose and in that form of administration. In relation to these results, Ashmawy (2010) reports having obtained the coccidicidal effect of garlic in young rabbits, for which he crushed the bulbs, diluted them in water and administered them orally for five successive Days, with zero oocysts at the end of the experimental period. Graph 1 of this study shows the decrease in thousands of *Eimeria* spp. oocysts and *Ascaridia galli* eggs. to 0 of these on Day 9 post-sampling.

The results in Table 2 indicate that, as the Days of treatment elapsed and, consequently, the consumption of garlic, the parasite load decreased, so that on Day 9 post-treatment in all treatments the ovicidal load is zero. The results of this study coincide with what was observed by Juárez-Caratachea et al. (2021),

Sampling	Sampling 1, Day 0	Sampling 2, Day 9
<i>Eimeria spp.</i>	10,200± 3,700	0 ± 0
<i>Ascaridia galli.</i>	860 ± 346	0 ± 0

Table 1. Egg count during sampling in the 5g/liter treatment

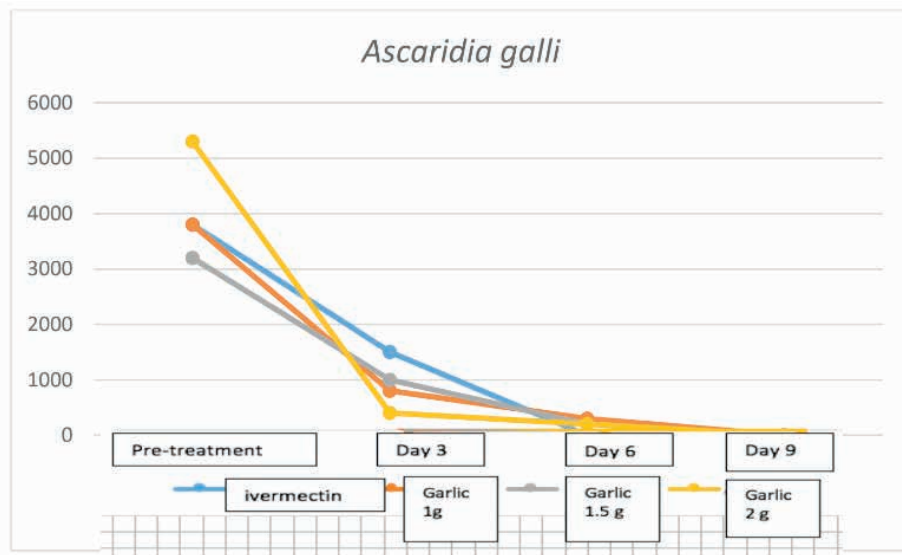


Graph 1. Frequency of *Ascaridia galli* eggs and *Eimeria spp.* oocysts, on Days 0 and 9 of the sampling period.

TREATMENT	Sampling 1 (Day 0)	Sampling 2 (Day 3)	Sampling 3 (Day 6)	Sampling 4 (Day 9)
COMMERCIAL WORM AGENTS	760 ± 456 ^a	300 ± 316 ^b	0 ± 0 ^c	0 ± 0 ^c
1g of garlic	760 ± 433 ^a	160 ± 167 ^b	60 ± 89 ^c	0 ± 0 ^d
1.5g of garlic	640 ± 507 ^a	200 ± 346 ^b	40 ± 89 ^c	0 ± 0 ^d
2g of garlic	1060 ± 541 ^a	80 ± 178 ^b	±89 ^c	0 ± 0 ^d

^{a,b} averages with different literals within the rows (sampling moment) show statistically significant differences (P<0.05).

Table 2. *Ascaridia galli* egg count. in the four treatments

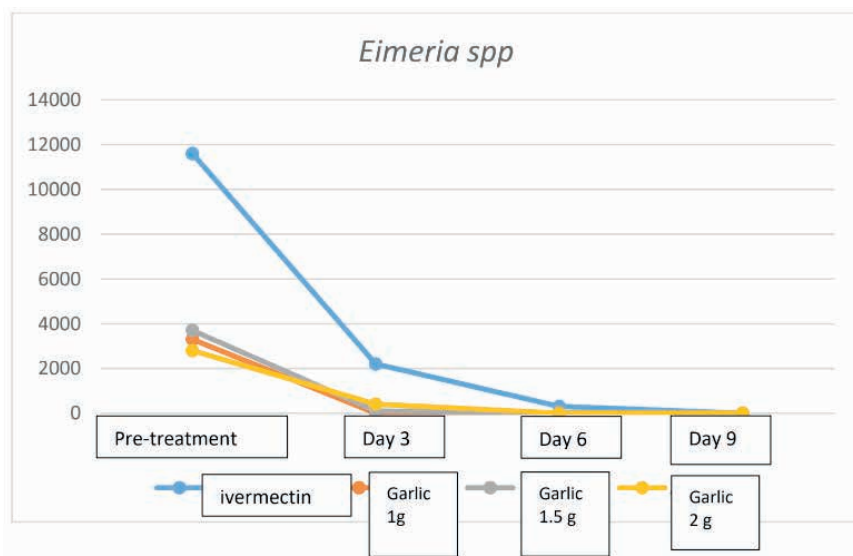


Graph 2. Frequency curve of *Ascaridia galli* eggs during the days of treatment.

TREATMENT	Sampling 1 (Day 0)	Sampling 2 (Day 3)	Sampling 3 (Day 6)	Sampling 4 (Day 9)
COMMERCIAL WORM AGENTS	2320 ± 2989 ^a	440 ± 358 ^b	60±89 ^c	0 ± 0 ^d
1g of garlic	660 ± 336 ^a	0 ± 0 ^b	0 ± 0 ^b	0 ± 0 ^b
1.5g of garlic	740 ± 594 ^a	20 ± 45 ^b	0 ± 0 ^c	0 ± 0 ^c
2g of garlic	560 ± 403 ^a	80 ± 84 ^b	0 ± 0 ^c	0 ± 0 ^c

^{a,b} =means with different literals within the rows show statistically significant differences (P<0.05).

Table 3. *Eimeria* spp oocyst count in the four treatments.



Graph 3. Frequency curve of *Eimeria* spp oocysts during the treatments.

in a similar study carried out with turkeys. According to Guimerans (2005), garlic contains a therapeutic principle called allicin, it is a sulfur compound with deworming activity, so perhaps this explains the reduction in parasitic infestation, as also shown in Graph 2, with a decrease in number of eggs.

The condensed stool results in Table 3 and Graph 3 show that the three doses of garlic reduced to 0 oocysts of *Eimeria* spp, on the third sampling or sixth Day of treatment, compared to the commercial product, in contrast to the results of Table 2 and Graph 2, where similar results are shown in favor of the commercial product against *Ascaridia galli*. In this regard, Ávila (2013) evaluated the antiparasitic effect of two garlic-based treatments (tincture and macerated) against *Ascaridia galli* in backyard birds and observed that macerated garlic presented 100% antiparasitic effectiveness at five days post-treatment. Chávez (2016), reports similar results in broilers treated with extracts of garlic and onion.

The prohibition of antibiotics as growth promoters in the European Union has forced the poultry sector to search for alternative products that ensure similar levels of production and safety, in this regard Baños and Guillamón (2014), have tested garlic and onion. in poultry production and conclude that they are an effective natural solution as growth promoters, with an antiparasitic effect against eimeriasis.

Finally, based on the negative stool data obtained on the sixth or ninth day of sampling, it is concluded that garlic, both crushed and loose in water, as well as the fragmented bulb, taken orally, was effective as a natural antiparasitic against *Eimeria* spp. and *Asaridia galli*, in Creole backyard chickens. The results suggest that 1g (administered as food) is sufficient, since it showed the same effect as 1.5 and 2g. However, the 5g blended and administered as a drink, to the group of 10

hens, resulted in the lowest dose (0.5g/bird/day) and with less flock management.

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