

THE EFFECTS OF *ALLIUM SATIVUM* AND *ARTEMISIA ABSINTHIUM L.* ON THE SPORULATION OF *EIMERIA SPP.* OOCYSTS DURING AN EXPERIMENTAL (*IN VITRO*) STUDY

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• Introduction

Coccidiosis is a protozoosis, which causes important economic losses in the swine industry throughout the world, either due to mortality or to weight loss. Herbs and their extracts, such as alcoholic extracts have been used for a long time in traditional medicine. The study aimed to emphasize and compare the antiparasitic effects of *Allium sativum* (garlic) and *Artemisia absinthium L.* (wormwood) against *Eimeria* spp. oocysts through an experiment performed *in vitro*.



Fig. 1. Picture showing a free-range farm.

• Material and method

Two control and two experimental groups were established with each group placed in cell culture plates of 3 ml. The first control group contained 0.25 ml suspension of oocysts, 0.25 ml of 2.5% potassium dichromate and 0.5 ml distilled water. In the second control group (0.25 ml suspension of oocysts, 0.25 ml of 2.5% potassium dichromate and 0.5 ml of ethanol), the distilled water was substituted with ethanol of 5 different concentrations (70%, 35%, 17.5%, 8.75%, and 4.375%). The experimental groups were built similarly, by using 0.25 ml suspension of oocysts, 0.25 ml of 2.5% potassium dichromate and 0.5 ml of alcoholic extract from the above mentioned plants. The plant extracts were added at different concentrations (10%, 5%, 2.5%, 1.25%, 0.625%) in each of the experimental groups. For each dilution and group (both control and experimental), 5 wells were used (3750 oocysts/well). All groups were incubated at 27 °C for the duration of the experiment. The study lasted for a total of 96 hours, during which oocysts belonging to *Eimeria* spp. were examined under a microscope at 24, 48, 72, and 96 hours.



Fig. 2. All the materials necessary for the copro-parasitological method.

• Results and discussions

	C (E70% +PB)	C (E35% +PB)	C (E17.5% +PB)	C (E8.75% +PB)	C (E4.35% +PB)	C PB
S	6.6 (±1.14)	8 (1)	13	22.6	42.2	67.4
A(sd)			(±3.08)	(±1.82)	(±2.59)	(±5.22)
U	47.2	57.2	51.4	46.8	32.6	27.6
A(sd)	(±6.06)	(±5.40)	(±7.16)	(±4.96)	(±3.03)	(±6.77)
D	46.2	34.8	35.6	30.6	25.2	5
A(sd)	(±6.38)	(±5.67)	(±5.81)	(±5.77)	(±4.27)	(±2.55)
	W 10%	W 5%	W 2.5%	W 1.25%	W 0.62%	C PB
S	5	7	9.4	15.4	26.6	67.4
A(sd)	(±1.58)	(±1.22)	(±2.30)	(±2.30)	(±2.70)	(±5.22)
U	35.8	36.2	47.6	45.8	34.6	27.6
A(sd)	(±4.32)	(±4.49)	(±5.55)	(±3.03)	(±6.19)	(±6.77)
D	59.2	57.2	43	38.8	34.8	5
A(sd)	(±5.40)	(±3.63)	(±7.11)	(±3.03)	(±5.26)	(±2.55)
	G 10%	G 5%	G 2.5%	G 1.25%	G 0.62%	C PB
S	4.2	7.4	12	17.8	27.6	67.4
A(sd)	(±1.30)	(±1.14)	(±1.87)	(±4.82)	(±3.91)	(±5.22)
U	33.6	40	43	51.2	49.2	27.6
A(sd)	(±4.93)	(±4.42)	(±6.20)	(±1.64)	(±2.49)	(±6.77)
D	62.2	52.4	43	31	25.2	5
A(sd)	(±4.97)	(±3.51)	(±6.20)	(±3.94)	(±4.32)	(±2.55)

Table 1. The percentage of sporulated, unsporulated and destroyed oocysts after 96 hours of incubation. List of conventional signs: W- *Artemisia absinthium*, G- *Allium sativum*, C- control group, E- ethanol, PB- potassium dichromate, S- sporulated oocysts, U- unsporulated oocysts, D- destroyed oocyst, A- average and sd- standard deviation.



Fig. 3. In these images, unsporulated, sporulated and destroyed oocysts are observed.

• Conclusions

Both plant extracts had a good antiparasitic effect *in vitro* against oocysts of *Eimeria* spp. compared with the control groups. After 96 hours, in all experimental groups, the inhibitory effect on sporulation was observed.

The group with 1.25% garlic extract had the strongest inhibitory effect (51.2%) while the highest percentage of destroyed oocysts (62.2%) was registered in the group with 10% garlic extract.

Despite these results, further research with different concentrations is required for a better understanding of the effect of these plants on *Eimeria* spp. oocysts from swine.