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Inhibitory properties of disinfectants on the sporogony of *Eimeria tenella* (Protista, Eimeriidae)

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The protozoa of kingdom Protista are widespread pathogens of gastrointestinal protozoal diseases in chickens and cause significant economic losses to farms. Prevention includes a set of measures to treat poultry with effective drugs, and disinfect the environmental objects using modern, safe and beneficial means. For this purpose, it is recommended to use disinfectants that have been tested for their disinfestation effect. The aim of the research was to investigate the disinfestation effect of chemicals on the process of sporulation of *Eimeria tenella* oocysts isolated from chickens in laboratory conditions. It was found that the disinfectants "Virosan" (active substances – alkyldimethylbenzylammonium chloride and glutaraldehyde) and "Yoderin" (contains iodophores) had disinvasive properties, but their indicators of inhibitory action against sporogony of *E. tenella* oocysts were not the same. The most effective was the agent alkyldimethylbenzylammonium chloride and glutaraldehyde mixture, with a 100% inhibitory effect when used at a 0.5% concentration and exposure of 150 minutes. At lower exposures and concentrations, its indicators of inhibitory action ranged within the following limits: at 0.1% concentration to 57.0%, at 0.25% concentration to 84.5%. The inhibitory effect of the iodophor-based disinfectant was lower and varied depending on the exposure (from 30 to 150 min) within the following limits: at 0.5% concentration to 35.7%, at 1.0% concentration to 68.2%, at 2.0% concentration to 93.1%. In addition to stopping the development of *Eimeria* oocysts, the disinfectants induced changes in their morphological and metric indicators. Metric indicators of oocysts under the action of disinfectants were characterized by lower values of their width (by 4.8–8.7%), and under the action of the iodophor-based agent, by a decrease in the ratio of length / width of oocysts (by 11.0%). The obtained results of the inhibitory action of the disinfectants present prove the possibility of using these agents to combat and prevent eimeriasis in chickens.

Keywords: Apicomplexa; coccidian parasite; chicken; oocysts; disinfestation action; morphometric changes.

Introduction

Scientific literature shows that gastrointestinal protozoan infections are among the most widespread parasitoses on poultry farms in many countries of the world, especially on farms with floor-based poultry housing. Protozoa of the genus *Eimeria* are the most relevant among the gastrointestinal protozoa in chicken. They cause eimeriasis, and the most pathogenic species is *Eimeria tenella* (Shirley, 1997; Fatoba & Adeleke, 2018; Badri et al., 2024). The disease is accompanied by impaired growth and development of birds and suppression of their immune system, which leads to high mortality, and thus causes enormous economic losses in poultry farming (Blake, 2015; Freitas et al., 2023).

Such a significant spread of *Eimeria* among birds is due to their development cycle, and high resistance of oocysts to abiotic and biotic factors of the external environment. Thus, according to the development cycle of *Eimeria*, their oocysts are released with droppings into the environment, where the process of their sporulation and the formation of invasive oocysts occurs. That contamination of the environment persists for a long time and can lead to alimentary infection of susceptible bird populations (Chapman, 2014; Debbou-Iouknane et al., 2018; El-Shall et al., 2022).

Eimeria spp. oocysts multiply rapidly under favorable temperature, humidity and oxygen regime. In addition, the increased use of prophylactic anti-*Eimeria* drugs in poultry feed is raising concerns about the development of parasite resistance and the presence of drug residues in poultry products (Brito et al., 2014; Ojimelukwe et al., 2018). Therefore, to effectively combat *Eimeria* in chickens, a set of measures is required, which includes not only treatment with effective anti-*Eimeria* drugs, but also disinfestation of environmental objects. To this end, scientists around the world are testing the disinfestation properties of various drugs, agents and substances that have different effectiveness against *Eimeria* oocysts (Guimarães et al., 2007; Li et al., 2008; Abd-Elrahman et al., 2022).

Thus, the disinvasive action of benzene + xylene (dilution 1 : 10), cresol and acetic acid *in vitro* was 75.9%, 85.5% and 91.7%, respectively (You, 2014). Inhibitory properties against *E. tenella* oocysts were found for 60% orthodichlorobenzene + 30% xylene (79.5%), as well as 10% NaOH (with exposure of 2, 10 and 30 minutes) (Hilbrich, 1975; Guimaraes et al., 2007). In other studies, low inhibitory ability of NaOH against sporulation of *E. tenella* oocysts (65%) was observed. The disinfestation efficacy of ammonium hydroxide and phenolic disinfectants varied depending on their concentration and ranged from 2.9% to 91.3% (Rajendran & Fatima, 2023). Disinfestation efficacy of cresol-based disinfectants such as Preventol against *Eimeria* spp. oocysts ranged from 17% to 49% (Daugschies et al., 2002). Also, chemicals such as ethanol, formalin and sodium hypochlorite were found to inhibit sporulation of *Eimeria* spp. oocysts isolated from chickens by 49% to 100% (Gadelhaq et al., 2018). High inhibitory properties on *E. tenella* sporulation were found when using phenols, ammonia and methyl bromide, as well as 0.20% chlorhexidine gluconate solution (>99%) (Williams, 1997; Laverty et al., 2023).

To date, a significant number of works have been devoted to the study of the inhibitory effect of substances of plant origin on the sporulation of *Eimeria* oocysts. This is due to the fact that plant remedies have numerous advantages, since they are environmentally safe, widespread in nature, and do not leave residues in the environment (Jitviriyanon et al., 2016; Isakroudi et al., 2018; Ristanti et al., 2024). In particular, the activity of *Morus nigra* leaf extracts *in vitro* and *in vivo* against the sporulation of *E. papillata* oocysts was tested. The tested substance significantly reduced the formation of sporulated oocysts (up to 86%) (Thagfan et al., 2020). In another study, the effect

of essential oils from 14 plant species (*Piper cubeba*, *Cananga odorata*, *Pelargonium graveolens*, *Citrus sinensis*, *Eucalyptus globulus*, *Lavandula angustifolia*, *Picea abies*, *Citrus paradisi*, *Pterocarpus santalinus*, *Abies sibirica*, *Juniperus communis*, *Melaleuca alternifolia*, *Syzygium aromaticum*, and *Cinnamomum verum*) on the sporulation process of *E. magna* was tested. The high disinvasive effect of essential oil of *C. verum* (100%) was proven. The use of essential oil of *S. aromaticum* was less effective (54%). Other essential oils either delayed the sporulation of *E. magna* oocysts or were ineffective (Boyko et al., 2021a). Hence, there is a need to conduct studies to test the inhibitory properties of new modern disinfectants against *Eimeria* oocysts parasitizing chickens, in order to recommend highly effective means in measures to combat and prevent chicken eimeriasis.

The aim of the research was to investigate the disinvasive effect of chemicals on the sporulation process of *Eimeria tenella* oocysts isolated from chickens in laboratory conditions.

Materials and methods

The work was carried out during 2025 in the Laboratory of Parasitology and Veterinary and Sanitary Examination of the Poltava State Agrarian University (Ukraine).

The research protocol of the current study was approved by the Ethic Committee of the Poltava State Agrarian University (Approval number: 2025/2).

The following disinfectants were tested for inhibitory propersites: "Virosan" (AS alkyldimethylbenzylammonium chloride, glutaraldehyde; Biotestlab LLC, Ukraine) and "Yoderin" (AS iodophors; UPSP Western Veterinary Company LLC, Ukraine). Test cultures of unsporulated oocysts of *Eimeria tenella* isolated from the droppings of sick chicken were used for the experiment. Preparation of oocyst cultures for research was carried out according to the method (Conway & Mckenzie, 2007).

In laboratory conditions, Petri dishes (Ø 40 mm) were prepared with a mixture of *E. tenella* oocysts (150–200 oocysts). Disinfectants were added to each dish in concentrations of 0.1%, 0.25%, and 0.5% ("Virosan"), and 0.5%, 1.0%, 2.0% ("Yoderin"). After appropriate exposures (30, 60, 90, 120 and 150 min), the test cultures of *E. tenella* oocysts were washed in distilled water and transferred to separate Petri dishes. Control test cultures of *E. tenella* oocysts were also prepared, in which saline solution was added instead of disinfectants. After that, the experimental and control dishes were placed in a thermostat at a temperature of 25 °C and cultivated for 48 hours. After incubation in the experimental and control test cultures, the number of sporulated, unsporulated and destroyed oocysts per 100 tested oocysts was counted. The experiment for each disinfectant was repeated three times. The disinvasion efficiency of the disinfectants was determined by the percentage of sporulation inhibition (Sp, %) (Cedric et al., 2018).

Morphometric parameters of *E. tenella* oocysts (n = 14) were studied using the ToupView program version × 64, 4.10.17015.2020 0426 (Hangzhou ToupTek Photonics Co., Ltd, China). Microphotography was performed using a SIGETA M3CMOS 14000 14.0 MP digital camera (China).

Standard deviation (SD) and average values (x) were calculated. Differences between the values of the groups were determined using the Tukey test, the differences were considered significant at $P < 0.05$.

Results

The conducted studies show that the most effective agent in terms of disinvasive action on the sporulation of *E. tenella* oocysts was the drug "Virosan", with a 100% inhibitory effect when it was used at a 0.5% concentration with an exposure of 150 min (Table 1).

With increasing concentration of the agent, the indicators of inhibitory action and the number of deformed oocysts (NDO) in test cultures also increased. Also, with increasing exposure within the same concentration of the agent "Virosan", the indicators of its disinvasive action increased. Thus, at 0.1% concentration, depending on the exposure (from 30 to 150 min), Sp ranged from 16.2 ± 6.0% to 57.0 ± 6.8%, and NDO from 1.7 ± 0.6% to 10.0 ± 2.0%, at 0.25% concentration Sp varied from 65.0 ± 3.1% to 84.5 ± 2.9% and NDO from 12.7 ± 2.1% to 19.3 ± 1.2%, at 0.5% concentration Sp was in the range of 87.4 ± 2.9% to 100.0 ± 0.0% and ranged from 20.0 ± 1.7% to 30.3 ± 1.5%.

Table 1
Indicators of the inhibitory action of the drug "Virosan" on the sporulation of *Eimeria tenella* oocysts (x ± SD, n = 3, %)

Sporulation parameters	Time of exposure, min	Concentration of preparation		
		0.1%	0.25%	0.5%
Formation of sporulated oocysts	30	77.3 ± 5.7 ^{f}	32.3 ±3,5 ^{de}	11.7 ± 3.1 ^{abc}
	60	64.3 ± 5.8 ^{fe}	22.7 ± 4.7 ^{cd}	7.7 ± 2.1 ^{abc}
	90	56.7 ± 8.1 ^{e}	20.3 ± 4.9 ^{cd}	5.3 ± 1.5 ^{ab}
	120	47.0 ± 4.6 ^{e}	17.3 ± 3.2 ^{bc}	3.3 ± 1.5 ^{ab}
	150	39.7 ± 5.9 ^{e}	14.3 ± 3.2 ^{bc}	0.0 ± 0.0 ^{a}
Unsporulated oocysts	30	21.0 ± 6.2 ^{a}	55.0 ± 3.5 ^{def}	68.3 ± 3.8 ^{fg}
	60	32.3 ± 4.6 ^{ab}	62.3 ± 4.7 ^{efg}	70.3 ± 3.1 ^{gh}
	90	38.3 ± 8.1 ^{bc}	64.0 ± 4.6 ^{efg}	70.7 ± 3.5 ^{gh}
	120	44.0 ± 4.4 ^{bcd}	65.0 ± 4.0 ^{fg}	71.0 ± 1.7 ^{gh}
	150	50.3 ± 6.5 ^{cde}	66.3 ± 3.8 ^{fg}	69.7 ± 1.5 ^{gh}
Deformed oocysts	30	1.7 ± 0.6 ^{a}	12.7 ± 2.1 ^{cde}	20.0 ± 1.7 ^{fg}
	60	3.3 ± 1.2 ^{a}	15.0 ± 2.0 ^{de}	22.0 ± 1.0 ^{ghi}
	90	5.0 ± 1.0 ^{ab}	15.7 ± 2.1 ^{ef}	24.0 ± 2.6 ^{ghi}
	120	9.0 ± 2.0 ^{bc}	17.7 ± 2.5 ^{ef}	25.7 ± 0.6 ^{ij}
	150	10.0 ± 2.0 ^{bcd}	19.3 ± 1.2 ^{efh}	30.3 ± 1.5 ^{j}
Sporulation inhibition, %	30	16.2 ± 6.0 ^{a}	65.0 ± 3.1 ^{ef}	87.4 ± 2.9 ^{hi}
	60	30.3 ± 3.9 ^{b}	75.5 ± 4.3 ^{fgh}	91.7 ± 1.9 ^{ij}
	90	38.6 ± 6.6 ^{bc}	78.0 ± 1.5 ^{gh}	94.2 ± 1.5 ^{ij}
	120	49.1 ± 4.6 ^{cd}	81.2 ± 2.9 ^{gh}	96.4± 1.5 ^{ij}
	150	57.0 ± 6.8 ^{de}	84.5 ± 2.9 ^{ghi}	100.0 ± 0.0 ^{j}

Note: different letters within the sporulation parameters at all concentrations and exposures of disinfectants indicate significant ($P < 0.05$) differences between groups according to Tukey's test results.

The disinfectant "Yoderyn" was less effective compared to "Virosan". In particular, the highest inhibitory effect of "Yoderyn" was found at its highest concentration and exposure (2.0% and 150 min), 93.1 ± 4.6% (Table 2).

Table 2
Indicators of the inhibitory action of the drug "Yoderyn" on the sporulation of *Eimeria tenella* oocysts (x ± SD, n = 3, %)

Sporulation parameters	Time of exposure, min	Concentration of preparation		
		0.5%	1.0%	2.0%
Formation of sporulated oocysts	30	84.0 ± 5.6 ^{j}	53.3 ± 5.1 ^{gh}	24.3 ± 4.2 ^{bce}
	60	78.3 ± 6.4 ^{j}	45.0 ± 5.3 ^{fgh}	21.0 ± 4.4 ^{abd}
	90	75.3 ± 5.5 ^{j}	38.3 ± 4.9 ^{efg}	15.7 ± 5.5 ^{ab}
	120	70.3 ± 7.4 ^{ij}	34.0 ± 4.4 ^{cdf}	11.0 ± 4.4 ^{ab}
	150	59.3 ± 3.8 ^{hi}	29.3 ± 4.9 ^{ce}	6.3 ± 4.5 ^{a}
Unsporulated oocysts	30	14.7 ± 5.7 ^{a}	41.3 ± 4.7 ^{cd}	64.0 ± 3.6 ^{fgh}
	60	20.0 ± 6.1 ^{a}	48.0 ± 5.2 ^{cde}	66.0 ± 3.6 ^{fgh}
	90	22.0 ± 6.1 ^{ab}	53.7 ± 4.0 ^{def}	69.3 ± 5.5 ^{gh}
	120	26.0 ± 7.0 ^{ab}	56.3 ± 4.0 ^{ef}	72.0 ± 3.5 ^{gh}
	150	36.7 ± 4.6 ^{bc}	60.7 ± 4.9 ^{fg}	75.7 ± 4.2 ^{h}
Deformed oocysts	30	1.3 ± 0.6 ^{a}	5.3 ± 0.6 ^{cd}	11.7 ± 0.6 ^{gh}
	60	1.7 ± 0.6 ^{ab}	7.0 ± 1.0 ^{de}	13.0 ± 1.0 ^{hi}
	90	2.7 ± 0.6 ^{ab}	8.0 ± 1.0 ^{ef}	15.0 ± 1.0 ^{ij}
	120	3.7 ± 0.6 ^{ac}	9.7 ± 1.2 ^{fg}	17.0 ± 1.0 ^{jk}
	150	4.0 ± 1.0 ^{bc}	10.0 ± 1.0 ^{fg}	18.0 ± 1.0 ^{k}
Sporulation inhibition, %	30	9.0 ± 5.6 ^{a}	42.2 ± 4.1 ^{cd}	73.6 ± 3.7 ^{fg}
	60	15.2 ± 7.5 ^{a}	51.3 ± 4.3 ^{de}	77.3 ± 3.9 ^{gh}
	90	18.4 ± 6.3 ^{a}	58.5 ± 3.8 ^{ef}	83.0 ± 5.3 ^{ghi}
	120	23,8 ± 7.8 ^{ab}	63.2 ± 3.4 ^{efg}	88.1 ± 4.2 ^{ghi}
	150	35.7 ± 4.4 ^{bc}	68.2 ± 4.1 ^{fg}	93.1 ± 4.6 ^{i}

Note: see Table 1.

With increasing exposure and concentration of the disinfectant "Yoderyn", its inhibitory effect and the percentage of deformed oocysts increased. Thus, at 0.5% concentration, depending on the exposure (from 30 to 150 min), Sp ranged from 9.0 ± 5.6% to 35.7 ± 4.4%, and NDO from 1.3 ± 0.6% to 4.0 ± 1.0%, at 1.0% concentration – from 42.2 ± 4.1% to 68.2 ± 4.1% and 5.3 ± 0.6% to 10.0 ± 1.0%, at 2.0% concentration – from 73.6 ± 3.7% to 93.1 ± 4.6% and from 11.7 ± 0.6% to 18.0 ± 1.0%, respectively.

With increasing exposure and concentration of the disinfectant "Yoderyn", both the inhibitory effect and the percentage of deformed oocysts increased. Thus, at 0.5% concentration, depending on the exposure (from 30 to 150 min), Sp ranged from 9.0 ± 5.6% to 35.7 ± 4.4%, and NDO – from 1.3 ± 0.6% to 4.0 ± 1.0%, at 1.0% concentration – from 42.2 ± 4.1% to 68.2 ± 4.1% and 5.3 ± 0.6% to 10.0 ± 1.0%, at 2.0% concentration – from 73.6 ± 3.7% to 93.1 ± 4.6% and from 11.7 ± 0.6% to 18.0 ± 1.0%, respectively.

The disinvasive effect of the disinfectants "Virosan" and "Yoderyn" was characterized by morphological changes in oocysts: stratification, wrinkling and rupture of the shell, resorption of the embryo. In the control test culture, sporulation did not occur in 7.7 ± 3.5% of *Eimeria* oocysts during cultivation, and in 92.3 ± 3.5%, the process of sporulation and the formation of sporulated oocysts occurred (Fig. 1a, 1b). Changes were also found in the metric indicators of oocysts, which differed in individual indicators in the test cultures treated with disinfectants and the control test cultures. In particular, "Virosan" at concentrations of 0.25 and 0.5% induced changes only in oocyst length. This indicator decreased at 0.25% concentration by 5.7% (21.6 ± 1.2 μm, $P < 0.05$), at 0.5% concentration by 8.7% (20.9 ± 1.2 μm, $P < 0.05$) compared to oocysts in the control test culture (22.9 ± 0.9 μm) (Fig. 2a). At the same time, although the indicators of oocyst width and length / width index decreased with increasing drug concentration, they did not have significant differences (Fig. 2b, 2c).

The agent "Yoderyn" in 1.0 and 2.0% concentrations led to changes in the oocyst length and length/width index. The length of oocysts in experimental test cultures decreased at 1.0% concentration by 4.8% (21.8 ± 1.3 μm, $P < 0.05$), at 2.0% concentration by 6.9% (21.3 ± 0.9 μm, $P < 0.05$) compared to oocysts in the control test culture (Fig. 3a). The length/width index of oocysts in experimental test cultures decreased only at 2.0% concentration by 11.0% (1.05 ± 0.1, $P < 0.05$) compared to oocysts in the control test culture (1.18 ± 0.1, Fig. 3c). The oocyst width indicators increased with increasing drug concentration, but without significant differences (Fig. 3b). In the control test culture, the length, width, and length/width index of unsporulated and sporulated oocysts did not differ significantly during sporulation.

Discussion

Disinfestation is carried out to effectively maintain epizootic well-being against the invasive diseases of animals and poultry, as well as control and prevent parasitic diseases. The objects of control are environmental elements that factor in the transmission of propagative stages of parasites (Paliy et al., 2018; Boyko & Brygadyrenko, 2019; Boyko & Brygadyrenko, 2021). To this end, scientists are constantly testing various disinfectants, chemicals and plant-based products against various parasitic pathogens found in certain regions (Melnychuk & Yuskiv, 2018; Boyko & Brygadyrenko, 2022, 2023; Boyko et al., 2025).

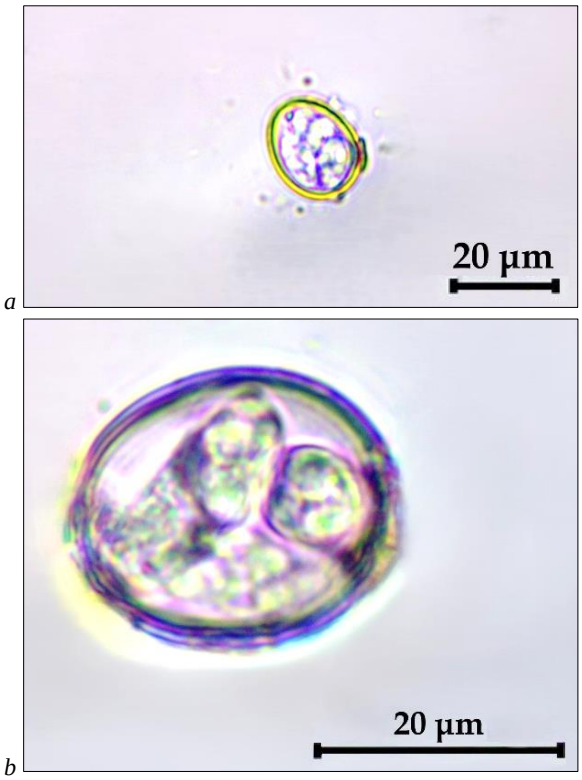

Fig. 1. Oocysts of *Eimeria tenella* in control test cultures: *a*, *b* – sporulated

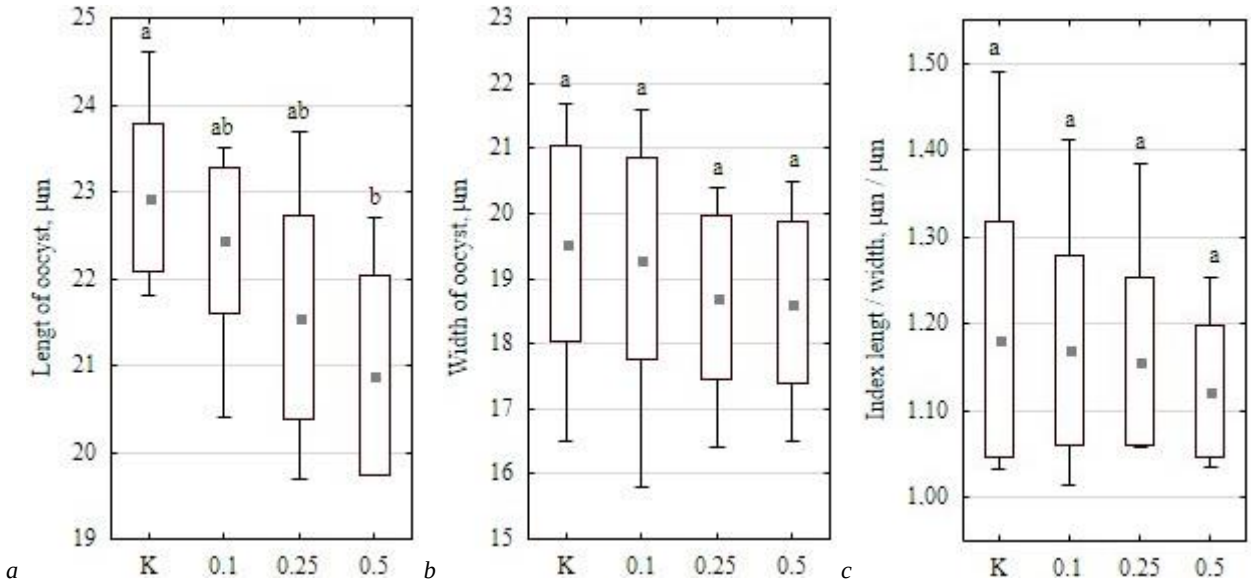

Fig. 2. Metric parameters of *Eimeria tenella* oocysts in test cultures when using the disinfectant "Virosan" in different concentrations with an exposure of 150 min: *a* – length of oocyst (μm), *b* – width of oocyst (μm), *c* – length/width index (μm/μm); *K* – control; the small square in the center corresponds to the median, the lower and upper borders of the large rectangular correspond to the first and the third quartiles, respectively, vertical line segments, directed up and down from the rectangular, correspond to minimum and maximum values (n = 14); different letters in the figure indicate significant ($P < 0.05$) differences between groups according to Tukey test results

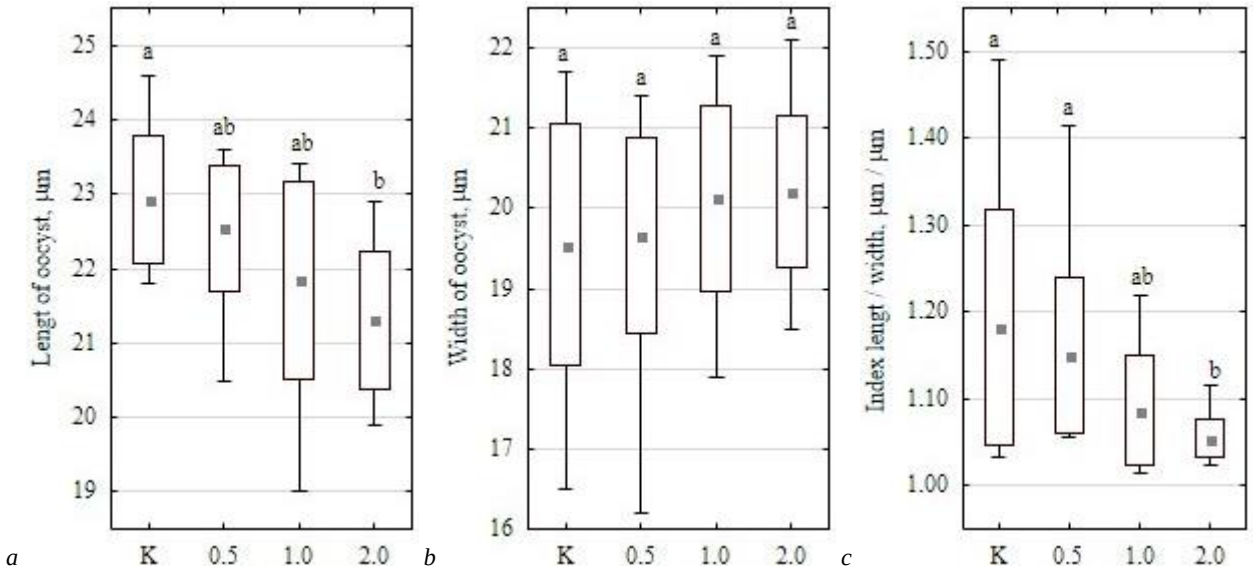

Fig. 3. Metric parameters of *Eimeria tenella* oocysts in test cultures when using the disinfectant "Yoderyn" in different concentrations with an exposure of 150 min: for notes, see Fig. 2

Disinfection is an essential measure for the control of *E. tenella* in poultry, and the high persistence of oocysts in the environment necessitates testing of drugs against sporulation (McDonnell & Russell, 1999; Vermeulen et al., 2001; Daugschies et al., 2002). Therefore, the aim of our studies was to test the inhibitory effect of modern disinfectants on the sporulation of *E. tenella* oocysts.

The conducted studies have established that the disinfectants "Virosan" and "Yoderyn" have disinvasive properties on the sporulation of *E. tenella* oocysts. Moreover, "Virosan" was the most effective agent, with a 100% inhibitory effect detected at a 0.5% concentration for an exposure of 150 min. Other concentrations had lower disinvasive action indicators, although the number of oocysts in which sporulation did not occur gradually increased with increasing concentration and exposure. Thus, at a 0.1% concentration, "Virosan" showed a maximum inhibitory effect of up to 57.0%, at a 0.25% concentration – up to 84.5%. The disinfectant "Yoderyn" showed lower values of inhibitory effect on the process of sporogony of *E. tenella*, the maximum number of unsporulated oocysts (93.1%) was detected when exposed to a test culture at a 2.0% concentration for 150 min of exposure. Similarly to "Virosan", lower concentrations and exposures of "Yoderyn" did not exceed the inhibitory effect indicators at 0.5% concentration – 35.7%, at 1.0% concentration – 68.2%. Simultaneously with the inhibitory process during sporulation, the destruction of oocysts was detected, which was accompanied by changes in their shell and embryo. Under the action of "Virosan", the number of deformed oocysts ranged from 1.7% to 30.3%, and under the action of the "Yoderyn", from 1.3% to 18.0%.

There are reports of low disinvasive effectiveness of chemical agents containing active substances such as alkyldimethylbenzylammonium chloride and glutaraldehyde against sporulation of *E. tenella*, *E. acervulina* and *E. maxima*. At the same time, the exposure of the agents to test cultures of *Eimeria* oocysts was 30 min (Guimarães et al., 2007). The data we obtained are partially consistent with these data, since the minimum values of the inhibitory effect of "Virosan" were obtained at an exposure of 30 min and its lowest concentration. High indicators of its inhibitory effect were found at an exposure of 150 min and the highest concentration.

We have found changes in the metric parameters of *E. tenella* oocysts under the influence of the tested disinfectants. The disinvasive effect of "Virosan" was characterized by a decrease in the length of the oocyst (by 5.7–20.9%, $P < 0.05$), and that of the "Yoderyn" by a decrease in the length of the oocyst (by 4.8–6.9%, $P < 0.05$) and the length / width index (by 11.0%, $P < 0.05$). There are no data in the available literature on changes in the metric parameters of *Eimeria* oocysts under the influence of various agents that confirm the detrimental effect on the pathogen. At the same time, other researchers have found that the disinvasive effect of disinfectants is manifested by changes in the metric parameters of eggs of helminths, such as *Capillaria* of cattle and *Trichuris* of sheep, which indicate a violation of the process of exogenous development (Melnychuk & Yuskiv, 2018; Petrenko & Kharchenko, 2023).

Therefore, the obtained results of the inhibitory action of the disinfectants "Virosan" and "Yoderyn" prove the possibility of using these agents in measures to combat and prevent eimeriasis in poultry.

Conclusion

It has been proven that the disinfectants "Virosan" and "Yoderyn" have disinvasive properties against the sporulation of *E. tenella* oocysts isolated from chicken, and "Virosan" showed the highest inhibitory effect. This disinfectant, when exposed for 30–150 min at a 0.1% concentration, resulted in inhibition of sporulation by 16.2–57.0% and deformation by 1.7–10.0% of *Eimeria* oocysts, at a 0.25% concentration – 65.0–84.5% and 12.7–19.3%, at a 0.5% concentration – 87.4–100.0% and 20.0–30.3%, respectively. The disinfectant "Yoderyn" at an exposure of 30–150 min at a 0.5% concentration led to inhibition of sporulation by 9.0–35.7% and deformation of 1.3–4.0% of *Eimeria* oocysts, at a 1.0% concentration – 42.2–68.2% and 5.3–10.0%, at a 2.0% concentration – 73.6–93.1% and 11.7–18.0%, respectively. The disinvasive effect of the disinfectants was accompanied by morphometric changes in *E. tenella* oocysts, where the length of oocysts during sporulation decreased by 5.7–20.9% when "Virosan" was applied to the test culture. The length of oocysts and the length/width index during sporulation decreased by 4.8–6.9% and 11.0%, respectively, when "Yoderyn" was applied.

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The authors state that there is no conflict of interest.

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