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PROPOLIS EXTRACT USE DIN INCUBATION TECHNOLOGY FOR HENS' EGGS TREATMENT

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Abstract

The eggs treatment process is one from which the result of incubation largely depends. In incubation for eggs disinfection are used different methods that affect the bacterial load. Choosing the most effective methods of eggs disinfection will depend on how used substances will influence on embryonic and postembryonic development of poultry. Currently the use of substances having disinfectant effect which would not have negative influence during embryonic and postembryonic development is one of the latest trends. As an alternative to chemical treatment methods it was proposed the use of propolis extract in hens' egg incubation. The aim of research was to determine the influence of propolis extract on hatching indices used in incubation of hens' eggs. At the end of the experience and data recording there was established that the maximum index of eggs hatchability was received as a result of using as a disinfectant the propolis extract in an amount of 2 ml/70 ml of water and 4 ml/70 ml water daily during the whole period of incubation. Hatchability was higher in first experimental group compared to the control group and second experimental group.

Key words: eggs, hens, incubation process, treatment.

INTRODUCTION

Achievements of science and best practices prove conclusively that one of the reserves of increase in hatchability, improving the quality of day-old chicks and their future viability and productivity is not only the continuous improvement of the conditions of eggs incubation, but the search for methods of stimulating the embryonic development.

It is found that a single treatment in critical periods of development in the embryonic or early postnatal ontogeny period influences the entire subsequent development program for the animal organism and, consequently, on their productivity (Бессарабов, 1983; Шакирева, 1997).

Several methods and disinfectants are available for hatching eggs disinfection in poultry. There are produced different antibacterial disinfectants that have an important role in poultry eggs hatching practice. There are used different methods of eggs treatment as: treatment by using formaldehyde; UV treatment; ozone therapy; nebulization with hydrogen peroxide and other. Substances for disinfection of hatching eggs are divided into: chemical; physical and biological. All the methods are more or less used because of their influence on egg shell bacteria. The most spread method of eggs disinfection is chemical, and the most popular disinfectant is formaldehyde. There is an actual tendency for avoiding formaldehyde because of its negative action on living beings as it is carcinogen.

Studies have shown that using biological methods in poultry eggs disinfection had a positive effect by increasing hatching indices. The disinfectant used, in itself, must fulfill different requirements: to have a broad spectrum (to be able to destroy a wide range of micro-organisms), to be active at low concentration, safe for human users as for eggs, without any corrosive action on metals, etc. As a natural disinfectant may be used propolis, as it has antibacterial properties. This product was used in different trails in eggs hutching. There was shown that propolis extract used in eggs hutching presented antibacterial and antifungical effect besides not being harmful to the embryo development

allowing high hatchability rates (Vilela et al., 2012; Shahein et al., 2014).

Propolis is a resinous mixture that honey bees collect from tree buds, sap flows, or other botanical sources. It is used as a sealant for unwanted open spaces in the hive. Propolis is used for small gaps. It is dark brown in color, but it can be found in green, red, black, and white hues, depending on the sources of resin found in the particular hive area.

Preliminary scientific studies show some types of propolis have in vitro antibacterial and antifungal activity with active constituent including flavonoids like galangin and hydroxycinnamic acids like caffeic acid.

Propolis and its ethanolic extract are usually used for treatment and prevention of different diseases. Propolis has antibacterial, antiviral, antifungal, anti-inflammatory, anesthetic and immunomodulating properties (Eremia, 2014; Majieneet al., 2004).

The main aim of this study was to determine the influence of propolis extract produced in our country in poultry eggs hatching on hutching indices.

MATERIALS AND METHODS

The present experiment was carried out in the Laboratory of Poultry and Eggs hutching, State Agrarian University of Moldova.

The propolis was collected from the central zone of Republic of Moldova. Brown propolis extract was produced beforehand and stored in a dark place at $+4^0$C.

To determine the influence of propolis extract eggs were collected from the parental flock of broiler chickens and were placed in incubation.

In the experiences were formed three groups: one control group and two experimental groups. Each group of eggs was placed in separated incubator. In each batch were placed in incubation of 120 eggs, before appreciating eggs quality parameters as: egg weight; index of eggs format; diameter of air chamber. To assess the quality indices 30 eggs were collected from each batch. Incubation was performed using identical regimens for chicken eggs hatching.

Because of propolis volatile properties it was placed in a container directly in the incubator. The propolis extract was added daily using 2 ml of extract diluted in 70 ml of distilled water for experimental group I and an amount of 4 ml diluted in 70 ml of distilled water in the second experimental group.

At the end of the incubation the hatching indices and the quality of the chickens were determined. Eggs with dead embryos were broken and age of embryonic death was determined.

All the results were processed and analyzed using Microsoft Excel program.

RESULTS AND DISCUSSIONS

For determination of the hatching performances the eggs quality indices were analyzed (Table 1).

Table 1. Hatching eggs quality indices

Group	Eggs format index (%)	Diameter of air chamber (mm)	Egg weight (g)		
			Nr. of weightings (days)		
	$\dot{X} \pm S\dot{x}$	$\dot{X} \pm S\dot{x}$	Before hatching	6	14
			$\dot{X} \pm S\dot{x}$		
Control	72.5 ± 0.5	17.7 ± 0.3	55.4 ± 0.6	53.5 ± 0.6	51.2 ± 0.6
Experimental I	72.5 ± 0.5	18.4 ± 0.4	54.9 ± 0.5	53.4 ± 0.6	51.2 ± 0.6
Experimental II	73.2 ± 0.3	18.1 ± 0.3	55.3 ± 0.6	53.5 ± 0.6	51.4 ± 0.5

Index format in groups ranged from 72.5% to 73.2%, the data showed that the index of format of hatching eggs of hens meet the requirements. Analyzing the diameter of the air chamber it can be concluded that it ranged from 17.7 to 18.4 cm, which proved that the eggs used in the experiment had shelf life no more than six days which meets the technology requirements. Another index is the egg weight that characterizes embryonic development and its evolution during the incubation period, knowing that significant changes of weight characterize the failure of incubation regime. In the experience hatching eggs weight had values that were within 54.9-55.3 g (Figure 1).

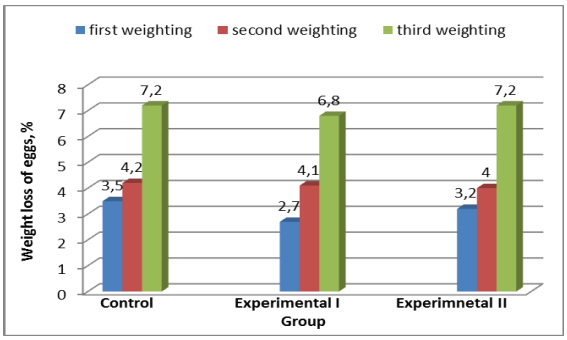

Figure 1. Weight loss of eggs during incubation, %

Analyzing weight loss shown in the diagram is noted that the total weight loss in different groups were different, registering 6.7% -7.7% values throughout the incubation period, maximum weight lost had the eggs in the control group but it should be mentioned that the total loss of weight in all groups were within the rules for this index (Table 2).

Table 2. Results of eggs hutching

Group	Total hatched eggs	Eggs fertility (%)	Eggs with dead embryos (%)		Dead chicks (%)	Hatchability of fertile eggs (%)	Hatchability of total eggs (%)
			6-14 days	15-20 days			
Control	120	95.8	6.0	3.5	3.5	86.9	83.3
Experimental I	120	92.5	3.6	-	2.7	93.7	86.7
Experimental II	120	96.7	5.1	1.7	4.3	88.8	85.8

The fertility of hatching eggs placed in the incubator ranged from 92.5% to 96.7%. Maxim eggs with dead embryos were observed from 6 to 14 days in the control group and accounted 6.0%, in other groups this index was low ranging from 3.6%-5.1%. It should be noted that the lowest mortality rate was 3.6% in first experimental group or 2.4% lower than in the control group. In the second experimental group, however this figure is lower compared to the control group, but higher compared with first experimental group.

Chicks hatching results showed that the maximum number of hatched chicks was obtained in first experimental group - 93.7% higher to the control group by 6.8% and 4.9% to the second experimental group (Figure 2).

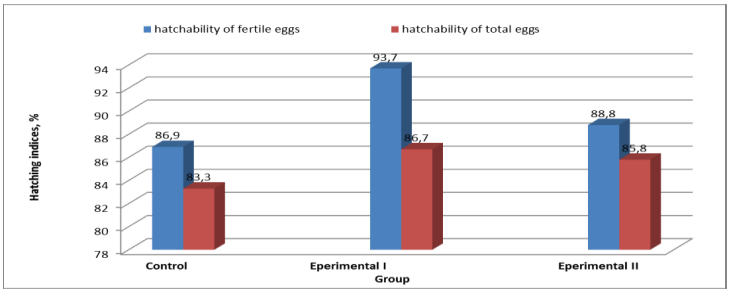

Figure 2. Hatching indices

At the days 15 to 20 of hatching, maximum percentage of eggs with dead embryos were observed in the control group (3.5%), while in experimental group II the index was lower (1.7%), in the experimental group I mortality was not observed. At hatching in all groups was recorded mortality rate that ranged from 2.7% to 4.3%,the lowest was 2.7% in the first experimental group (Figure 3).

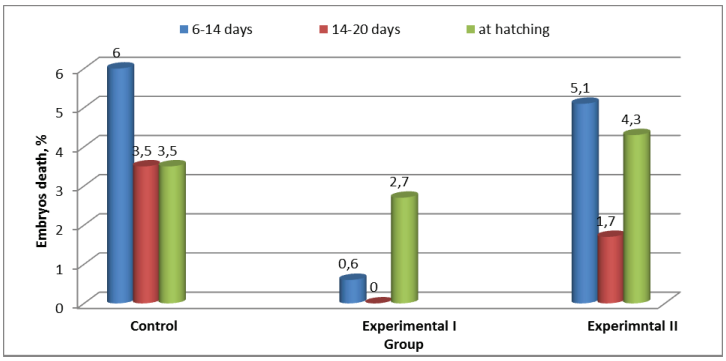

Figure 3. Embryos death during the hatching period

Another important indicator is the chicks' quality. Maximum number of checks of first quality was obtained in second experimental group -77.7% by 9.7% and 9.4% higher than in the other groups (Table 3).

Table 3.Chicks quality

Group	Total number of chickens	Quality, %		
		I	II	III
Control	100	68,0	30,0	2,0
Experimental I	104	68,3	26,9	4,8
Experimental II	103	77,7	22,3	-

CONCLUSIONS

The conducted experiments may explain the effect of propolis extract on mineral shell decontamination and increasing incubation indices, due to the ability of antimicrobial product used as a disinfectant.

There were recorded maximum indices of eggs, where was used as a disinfectant propolis extract in an amount of 2 ml/70 ml of water for the entire period of incubation, hatchability of fertile eggs was 93.7% or higher by 6.8% compared to the control group and by 4.9%, comparing to the same index in second experimental group. As well the embryos death during hatching period was lower in the experimental groups.

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