Scientific Papers, Animal Science, Series D, vol. LV CD-ROM ISSN 2285-5769, ISSN-L 2285-5750

STUDY OF MAGNETIC FIELD AND ULTRAVIOLET ACTIVATION IN GEESE EGGS HATCHING

Elena SCRIPNIC, Suzana MODVALA

The State Agrarian University of Moldova, 58, Mircesti str., MD 2049, Chisinau, Republic of Moldova, Phone: +373 22432083, E-mail: e.scripnic@uasm.md

Corresponding author email: scripnicelena@rambler.ru

Abstract

The hatching eggs disinfection it is a very important process of eggs hatching technology. The results of hatching process as well depend on the method of eggs disinfection before the incubation starts. Method of hatching eggs disinfection needs to be chosen in that way to improve the hatching eggs without harming pre and post development of poultry youth. Using of ultraviolet activation and different systems of magnetic fieldled to increase hatching index of geese eggs, better results of hatchability had the geese eggs after using magnetic field in system of permanent activation during 15 minutes and it was 75.3% in last experience or higher by 1.7% comparing with control group. Studding the embryo death during the hatching period there was established that the magnetic field used in permanent system during 15 minutes had a positive influence on this index and there was noticed the difference between first and control groups of 1.7% for first group. Studding the number of received goslings of first quality there was noticed that it was higher in the second group wheresystem of split magnetic field was used during 10 minutes and it was higher comparing with control group by 4.2%.

Key words: eggs hatching, magnetic field, ultraviolet activating, goslings

INTRODUCTION

Eggs incubation technologies provide various methods to increase the eggs hatching. One of the factors influencing the outcome of hatching process is the method of hatching egg sanitizing before their incubation. Currently in eggs incubation technology there are used two methods, namely chemical and physical. The chemical method of eggs processing provides using different chemical preparations to combat bactericidal load on the mineral egg shell, one of the most commonly used preparation is formaldehyde and other solutions some of which may have negative effects. Formaldehyde has been recognized as a preparation with negative effects on human health and being used in the eggs incubation may have a negative effect on the future of the chickens. Chemical method is not perfect and can be replaced by physical method of eggs processing. The most frequently used physical methods for processing the eggs, but also to stimulate embryonic development are ultraviolet radiation, laser, ionizing and lately for egg

processing there is used the method by using magnetic field [1,2,3,4, 5, 6,7].

The experimental results obtained are talking about positive action of artificial sources of eggs radiation of different species.

The positive influence of ultraviolet rays is not explained only by their bactericidal capacity, and ability to change physical and chemical properties of the eggs white and eggs yolk in the usefulness of their assimilation by the embryo [6].

Researches on mechanism of action of magnetic field on different systems and its use in poultry have been taken less compared with researches on other forms of activation.

The mechanism of biological action of the magnetic field is very compound due to its capacity of penetration and specific structural and functional features of different cells and tissues of the body.

There has been investigated the mechanism of action of magnetic field on the nervous, blood and muscle systems. Increasing of the body resistance firstlings more of all is related to nervous activity and endocrine system, which in turn draw in this process and other body systems.

Using ultraviolet and magnetic field activations in technology incubation of poultry eggs serve as a subject in carried out experiments.

Using optimal activation systems in hatching of eggs may influence the increasing of eggs hatchability index.

MATERIAL AND METHOD

The aim of present study was studding the influence of magnetic field and ultraviolet activation on geese eggs hatching index.

The studding object had served geese eggs of Holmogor breed, magnetic field generated by apparatus UEM 3and ultraviolet

raysgenerated by ultraviolet bulbs with registration numbers ICDR 4246 and ICDR 644182.

Apparatus UEM 3provides four modes of activation: continuous, frequent, impulsive 8 Hz and impulsive 16 Hz during different activation time.

Apparatus UEM 3 is provided to ensure therapeutic action on the human body using magnetic waves.

In the experiments were used geese eggs kept no more than nine days under proper technological conditions of temperature and humidity.

Before incubation there were determined the indices of hatching eggs.

Experimental series									
Experimental series									
First				Second			Third		
Groups	Number	Activation	Length of	Groups	Activation	Length of	Groups	Activation	Length of
	of eggs	system	activation		system	activation		system	activation
Control	600	-	-	Control	-	-	Control	-	-
, , , , , , , , , , , , , , , , , , ,									
1	600	permanent	5,10,15,	I	permanent	15	I	permanent	15
			20						
II	600	split	5,10,15,	II	split	10	II	split	10
			20						
III	600	impulsive	5,10,15,	III	impulsive	10	III	impulsive	10
		8Hz	20		8Hz			8Hz	
IV	600	impulsive	5,10,15,	IV	impulsive	10	IV	ultraviolet	15
		16Hz	20		16Hz				
V	600	ultraviolet	5,10,15,	V	ultraviolet	15	-	-	-
			20						

T 1 1 1 T 4 1 1

Activation of eggs with ultraviolet rays and magnetic field was made directly in the incubation boxes before eggs being placed in the incubator. Incubation was carried in the incubator of ИУП- Φ -3M type.

The experiments were performed in three experimental series. Experimental scheme is presented in Table 1.

The eggs of experimental group were exposed to activation with magnetic field and ultraviolet systems. There were not activated the eggs of control group. After the incubation process was finished the hatching index were calculated. All hatched goslings of each group were divided into quality class.

RESULTS AND DISCUSSIONS

At the end of the first series of carried out experiments in geese eggs hatching with use of ultraviolet activation and magnetic field with different activation times were determined the regimes that had the positive effect on analyzed hatching indices, also there was noticed a comparative decrease of embryo death and increasing the quality of goslings of first quality. In table 2 there are presents the results of incubation of geese eggs activated with ultraviolet activation and magnetic field in the first series of experiments.

Groups	Hatabability	\pm to control	Eggs	\pm to control	Embryo	\pm to control	
Groups	flatenaointy	group	hatching	group	death	group	
Control	74.6	-	62.7	-	25.4	-	
I, 15 min.	81.9	+7.3	69.0	+6.3	18.0	-7.4	
II,10 min.	74.4	+2.8	64.5	+1.8	22.6	-2.8	
III,10 min.	83.8	+8.8	69.8	+7.1	16.8	-8.6	
IV,10 min.	79.2	+4.6	66.0	+3.3	20.8	-4.6	
V, 15 min.	76.4	+1.8	63.7	+1.0	23.6	-1.8	

Table 2. The highest results of hatching index(first experience), %

According to the data presented in table 2it is necessary to mention that the activation system of gees eggs by magnetic field having the highest influence on hatching index was impulsive 8 Hz system with the length of activation 10 minutes and the level of goslings hatchability was 83.8% or by 8.8% higher comparing with the control group, where this index was 74.6%.

It is necessary to mention that in experimental group nr.V where ultraviolet activation during 15 minutes was used the best result had been received. There was recorded the hatchability at the level of 76.4%.Studing the embryo death as well the lowest level was noticed in experimental group nr. III being 16.8% or lower comparing with control group by 8.6%. During the experience there was studied the number of received goslings of first, second and third quality. The results of this study are presented in Fig. 1. There is presented the number of goslings of first quality and the difference between control group.

Data presented in Fig. 1 showed that the highest number of goslings of first quality had been received in second experimental group,

at the same time there was noticed that in two experimental groups this index was lower comparing with control group, so it is necessary to mention that the activation had different influence on this index.



Fig. 1 Goslings quality,% (first quality)

The lowest result of hatching index was received using permanent system during 5 minutes, and hatchability was 66.4% or lower comparing with control group by 8.2% and embryo death was higher by 8.2%.

In second experience there were used the activation systems that had showed good results in first experience. The results of the second experience are shown in table 3.

Groups	Hatchability	±to control group	Eggs hatching	± to control group	Embryo death	± to control group	Goslings quality	± to control group
Control	71.6	-	63.2	-	28.4	-	40.9	-
Ι	75.9	+4.3	66.7	+3.5	24.1	-4.3	42.5	+1.6
II	74.2	+2.6	65.8	+2.6	25.8	-2.6	47.3	+6.4
III	73.8	+2.2	65.2	+2.0	26.2	-2.2	44.8	+3.9
IV	73.1	+1.5	64.7	+1.5	26.9	-1.5	38.4	-2.5
V	74.5	+2.9	66.3	+3.1	25.5	-2.9	47.4	+6.8

Table 3. The highest results of hatching index in second experience, %

Presented results showed in experimental groups the goslings hatchability was higher compare with control group but it is necessary to mention that the highest index was noticed in first experimental group where permanent system of magnetic field was used during 15 minutes and it was 75.9 % and in the control group this index registered 71.6% as well as the embryo death was lower in all experimental groups but the lowest was noticed in the same experimental group with the difference between control group - 4.3% According to the data the highest number of goslings of first quality was received in experimental group nr. V where ultraviolet

experimental group nr. V where ultraviolet activation was used and this index registered 47.4% to 40.9 % in control group.

Feather there was held third experience. For this experience there was chosen the activation systems which showed better results during two previous experiences. There are shown the results of third experience in Fig. 2.

goslings hatchability
embryo deth





The results of third experience showed that studied index of hatchability were higher in experimental group but better results were received in group I where permanent magnetic system was used during 15 minutes.

CONCLUSIONS

After the experience has been finished it is possible to make next conclusions:

1. Using of ultraviolet activation and different systems of magnetic field led to increase hatching index of geese eggs, better results of hatchability had the geese eggs under the influence of magnetic field in system of permanent activation during 15 minutes and it was 75.3% in third experience or higher by 1.7% comparing with control group.

2. Studding the embryo death during the hatching period there was established that the magnetic field used in permanent system during 15 minutes had a positive influence on this index and there was noticed the difference between first and control groups of 1.7 % for first group.

3. Studding the number of received goslings of first quality there was noticed that it was higher in the second group where system of split magnetic field was used during 10 minutes and it was higher comparing with control group by 4.2%.

AKNOWLEDGEMENTS

The experience concerning the study of magnetic field and ultraviolet activation was carried out based on the state project for young researchers 04/ ind.

REFERENCES

[1] Contal C.D., Chaver C., Knape K.D.2000. *The factors of mecanical posibility on the eggs shell.* J. Poultry Science, 79(6):87.

[2] Gao F.L., Steward L.E., Joseph S. W.1997. *Applicated engeniering*. Agriculture: 355-359.

[3] Ilie Van.et al. 2000. *Incubația ouălor de palmipede. Tehnologia incubației ouălor*. Editura Ceres, București, 121.

[4] Macclon J.2000. *Recommendations to improve hatchability*. J. Poultry Science, 10:16.

[5]Scripnic E., et al. 2011. *Hatchability performances* of hen eggs under the influence of magnetic field. J. Lucrări științifice, Timișoara, 44(2):362-366.

[6] Резник Н., Попов А. 1991. Способ обработки гусиных яиц и повышение выводимости. J. Птицеводство, Москва, 11:10-13.

[7] Якименко И., Бесулин В., Бессарабов В. 2002. Использование лазерных лучей с целью повышения производственных показателей. J. Птицеводство, Москва,4:10-13.