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VETERINARY-SANITARY ASSESSMENT PRODUCTS OF SLAUGHTERED BROILER CHICKENS AT THE COMBINED EFFECT OF OCHRATOXIN A AND DEOXYNIVALENOL AND SORBENTS APPLICATION

The results of studies products of slaughtered broilers which feeding contaminated ochratoxin A and deoxynivaleno feed and with enterosorbents suggest that the organoleptic characteristics, chemical and bacterioscopic indicators are not inferior to the products of slaughtered chickens in the control group. Analysis of the data show the expediency of using enterosorbents (Toxy-Nil® Plus Unike, Mycofix® Plus 3.E, activated birch carbon) at the combined action of ochratoxin A and deoxynivalenol.

The most dangerous for animal health are feed contaminants anthropogenic and natural origin. Among them, most important significance has the widespread toxic mold metabolites – mycotoxins [1].

Today, more than 350 species micromicetes producing more than 400 mycotoxins [8]. Number of identified mycotoxins is constantly increasing. The most important mycotoxins are produced by molds belonging to the *Fusarium, Aspergillus* and *Penicillium* genera [10].

In poultry feed identify of several species fungi and mycotoxins simultaneously. The presence of several mycotoxins in feed may cause their synergistic and additive effects. Synergistic effects can already occur at low levels when the combined effects of two mycotoxins are much greater than the individual effects of each toxin alone. In contrast additive effects that occur when the combined effects of two mycotoxins are equal to the sum of the effects of each toxin given alone [6, 9].

The presence of mycotoxins in animal products (meat, eggs, milk) do not alter the appearance and organoleptic properties, therefore pose a great risk to consumers [1].

During the active use enterosorbents in veterinary medicine and poultry question veterinary and sanitary expertise, in particular safety performance and quality product, went unheeded researchers [2, 5].

Aim – to establish the efficacy of enterosorbents based on the veterinary-sanitary expertise of products slaughtered broiler chickens at the combined action of ochratoxin A and deoxynivalenol.

MATERIALS AND METHODS

Seventy five 6 day-old Ross-308 broiler chicks were divided by principle of analogues into five groups of 15 birds each. On the sixth day broiler chickens control group fed a free mycotoxin diet; group 1 fed diet was supplemented with 0,338 mg/kg ochratoxin A and 1,095 mg/kg deoxynivalenol; group 2 fed diet was supplemented with 0,338 mg/kg ochratoxin A (OTA) and 1,095 mg/kg deoxynivalenol (DON) with addition of 1,5 kg/t diet Toxy-Nil® Plus Unike; group 3 fed diet was supplemented with 0,338 mg/kg ochratoxin A and 1,095 mg/kg deoxynivalenol with addition of 1,5 kg/t diet Mycofix® Plus 3.E; group 4 fed diet was supplemented with 0,338 mg/kg ochratoxin A and 1,095 mg/kg deoxynivalenol with 3% of the dry matter feed *activated* birch *carbon*. The groups were kept under similar and standard hygienic and environmental conditions, and were supplied with feed and water *ad libitum* throughout the experimental period.

After 42 days was carried out the veterinary sanitary expertise of products slaughtered broiler chickens. Clinical condition of broiler chickens before slaughter and veterinary-sanitary expertise products of slaughter carried out ac-

Table 1 – **Body weight and carcass yield of broiler chickens, (M±m, n=3)**

Parameters	Control	Experimental groups			
		1	2	3	4
		OTA+DON	Toxy-Nil® Plus Unike	Mycofix® Plus 3.E	Activated birch carbon
Body weight, g	2626,80±7,10	2309,00±17,56*	2784,80±13,83*	2685,00±29,21	2651,40±13,76
Carcass weight without giblet, g	2036,20±17,45	1742,80±55,48*	2175,80±11,97*	2086,20±9,33*	2055,00±18,60*
Carcass yield, %	77,52±0,63	75,55±2,84	78,13±0,26	77,74±1,08	77,52±0,89

* P≤0,05, compared with control

Table 2 – **The water retaining capacity indicator of broiler meat, % (M±m, n=3)**

Muscles	Control	Experimental groups		
		2	3	4
		Toxy-Nil® Plus Unike	Mycofix® Plus 3.E	Activated birch carbon
Thighs	70,00±4,33	69,00±3,78	74,00±2,74	65,00±2,51
Breasts	56,00±4,60	60,00±3,74	56,00±4,41	65,00±4,80

cording to the «Rules of veterinary inspection of slaughter animals and veterinary-sanitary expertise of meat and meat products» [7] and DSTU 3136-95 «Poultry for slaughter» [4]. Slaughter of chickens produced in accordance with the requirements of technological instruction. Exsanguination was performed according to the P.V. Zhitenko et al. [5]. During the veterinary-sanitary expertise of products slaughtered broiler chickens all groups were evaluated: the degree of exsanguination, color and pathological changes on the skin, limbs, head, neck, visible mucous membranes and esophagus, crop, trachea, intestine, lungs, liver, heart, kidney, spleen, gizzard. Organoleptic study of meat and broth made according to GOST 7702.0 [3].

RESULTS

Pre-slaughter inspection broiler chickens suggests that the bird in experimental and control groups are actively moving and quickly respond to external irritants; position of the body and head at rest and in motion – natural; feathers clean, dry, close to the body; visible mucosa – pale pink color; discharge from eyes – absent; beak – dry; crests – pale pink color; surfaces of the limbs – dry without damage and swelling; litter is moderately dense; breath without wheezing; body temperature ranged between 41–42 °C; food and water consumption – active.

About the physiological condition of broiler chickens shown by the fact that during the period of experiment have been no cases of disease and death of birds. On the day of slaughter chickens for assessment indicators meet the requirements of DSTU 3136-95. Before slaughter poultry kept 10 hours without food, access to water was stopped for 2 hours before slaughtering.

The veterinary-sanitary expertise of products slaughtered broilers was carried out on the following parameters: external assessment of carcasses and products of slaughter (color, presence of changes in the skin and beneath the skin in the intestinal wall and parenchymal organs, the development of muscle and adipose tissue, odor).

In all groups the veterinary-sanitary inspection products of slaughter has not identified pathological changes. Carcass of broiler chickens in experimental groups by weight, and general view are similar to birds that the control group. Has a specific smell, pale yellow color across the surface. The muscles of carcasses are well developed. The subcutaneous fat localized in the lower abdomen and in the form of a strip which is interrupted on the back. The keel bone slightly stands out, form the sternum-rounded. On the cut muscle slightly wet, dense, elastic. The deepening formed by pressing a finger quickly leveled.

Slaughter yield carcasses and edible offal of broiler chickens is the one of the indicators of veterinary-sanitary expertise of meat and also assessing the impact of feeds on the body and its separate components, in particular enterosorbents.

As a result of feeding mycotoxins contaminated feed with enterosorbents for 36 days of broiler chickens experimental groups was obtained positive value of body weight and carcass yield (Table 1). The chickens experimental groups were fed diet with mycotoxins and enterosorbents found significant (P≤0,05) increase in carcass yield, compared with broilers in the control group by 6–8 %.

In the first experimental group, chickens were fed with ochratoxin A and deoxynivalenol contaminated feed, carcass yield was 75,6 % due to significantly lower body weight by 12 % relative to the control.

Weight whole *carcass without* the *giblets* (without blood, feathers, head, feet, wings, gastrointestinal tract, genitals) broiler first experimental group was less to 293,0 g than the control group. *Weight* whole *carcass without* the *giblets in* second experimental group was more than in the control group to 139,0 g; in third group – to 50,0 g; in fourth – to 18,8 g. *Weight* whole *carcass without* the *giblets in the* second experimental group was higher to 433,0 g; in the third – to 343,0 g; in the fourth – to 312,0 g compared with first experimental group (P<0,05).

Carcass of broiler chickens experimental and control groups did not show any differences in organoleptic. Breast muscles were white with a visible pink tinge, the moderately elastic and pressing a finger formed of rapidly vanishing deep-

Table 3 – **The tasting assessment (points) of broth from broiler meat (M±m, n=3)**

Parameters	Control	Experimental groups		
		2	3	4
		Toxy-Nil® Plus Unike	Mycofix® Plus 3.E	Activated birch carbon
Exterior view	4,27±0,15	4,05±0,03	4,18±0,11	4,13±0,09
Odor	4,03±0,02	4,03±0,02	4,82±0,08	4,20±0,12
Taste	4,40±0,17	4,45±0,24	4,68±0,16	4,25±0,10
Richness	4,29±0,12	4,30±0,03	4,08±0,04	4,40±0,20
Total assessment	4,32±0,17	4,20±0,12	4,44±0,19	4,25±0,12

Table 4 – **The tasting assessment (points)of meat broiler chickens (M±m, n=3)**

Parameters	Control	Experimental groups		
		2	3	4
		Toxy-Nil® Plus Unike	Mycofix® Plus 3.E	Activated birch carbon
Exterior view	4,00±0,15	4,13±0,06	4,25±0,09	4,43±0,15
Odor	4,20±0,16	4,00±0,16	4,48±0,14	4,30±0,19
Taste	4,35±0,14	4,26±0,13	4,57±0,25	4,16±0,11
Richness	4,20±0,11	4,15±0,12	4,65±0,20	4,25±0,15
Total assessment	4,15±0,07	4,08±0,03	4,65±0,18	4,38±0,21

ening. The muscles were wet on the cut. Thigh muscle had from pink to dark red color, were elastic and wet on the cut. The samples of chicken meat control and experimental groups are characterized by a relatively high water *retaining* capacity with no significant differences. The *water retaining capacity indicator of broiler meat experimental groups had no significant difference* compared with *control* group (Table 2). The obtained results showed the positive technological and culinary properties. Muscles of carcasses chickens all groups had a specific odor.

The tasting assessment of boiled meat and broth prepared from it did not found any differences (Table 3).

The data showed that in exterior view, odor, taste and richness of the broth from the meat of broiler chickens experimental groups had no differences from similar parameters of poultry control group.

Results in Table 4 shows of the tasting assessment of boiled meat broiler chickens in experimental groups which fed diet with addition enterosorbents. For the exterior view of chicken meat experimental groups got a few highest assessment compared with control; differences between parameters of control and experimental groups not statistically significant. For odor, taste, richness of the meat of broiler experimental groups similar those of the control group. Total tasting assessment has no significant difference compared with control group.

The chemical and bacterioscopic parameters of meat broiler chickens were determined immediately after slaughtering and after 48-hour period of storage under refrigeration. The data presented in Table 5 shows that the meat of broiler chickens as the control and experimental groups for major chemical parameters benign and suitable for storage. The results

Table 5 –**The chemical and bacterioscopic parameters of meat broiler chickens (M±m, n=3)**

Parameters	Muscles	Control	Experimental groups		
			2	3	4
			Toxy-Nil® Plus Unike	Mycofix® Plus 3.E	Activated birch carbon
pH	Thighs	5,98±0,08	6,08±0,08	6,07±0,03	5,95±0,07
pH	Breasts	5,61±0,06	5,80±0,16	5,64±0,05	5,66±0,06
Copper sulfate reaction	Thighs	Negative	Negative	Negative	Negative
	Breasts	Negative	Negative	Negative	Negative
Reaction on ammonia and ammonium salts	Thighs	Negative	Negative	Negative	Negative
	Breasts	Negative	Negative	Negative	Negative
Impression smears bacterioscopy (number of microorganisms in the field of view): the upper layers of the muscles	Thighs	3-5	3-5	3-5	4-7
	Breasts	3-5	4-7	3-5	4-7
Impression smears bacterioscopy (number of microorganisms in the field of view): the deeper layers of muscle	Thighs	Single microorganisms	Single microorganisms	Single microorganisms	Single microorganisms
	Breasts	Single microorganisms	Single microorganisms	Single microorganisms	Single microorganisms

of the qualitative reactions with copper sulfate and *Nessler's reagent* showed no change of chemical parameters in the meat of broiler chickens experimental groups.

Was established that the meat of broiler chickens experimental groups are well stored in the refrigerator conditions (t = 4–5 °C) for two days (Table 5). The biological parameters do not extend beyond acceptable standards and meat fit for addicting. The pH of broiler chicken meat experimental group has no significant difference compared with control.

Microscopy of impression smears from the deep layers of muscles after 2 days of storage indicates the presence of a single microorganisms mainly coccal form. In the field of view on impression smears of the upper layers of muscles broiler chickens control group were a 3–5 microorganisms, in experimental groups – 3–7. In meat of broiler chickens all groups breakdown of muscle tissues is not detected.

During storage at low plus temperatures of meat chickens control and experimental groups were resistant to spoilage. This is evidenced by a negative reaction with copper sulfate, and the reaction to the presence of ammonia. So after 2 days storage of meat broilers control and experimental groups is considered fresh, that is well kept.

CONCLUSION

1. The meat of broiler chickens which feeding contaminated ochratoxin A and deoxynivalenol feed and with enterosorbents that the organoleptic characteristics, chemical and bacterioscopic indicators are not inferior to the meat of chickens in the control group.

2. Analysis of the data show the expediency of using enterosorbents (Toxy-Nil® Plus Unike, Mycofix® Plus 3.E, activated birch carbon) at the combined action of ochratoxin A and deoxynivalenol.

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Ветеринарно-санітарна оцінка продуктів забою курчат-бройлерів при комбінованій дії охратоксину А і дезоксиніваленолу та застосуванні сорбентів. *Ю.В. Бойко, Г.В. Бойко, Р.І. Білик, В.Б. Духницький*

Результати дослідження продуктів забою курчат-бройлерів, яким застосовували сорбційні препарати при змішаному охра- і дезоксиніваленолотоксикозі, дозволяють стверджувати, що за органолептичними характеристиками, хімічними і бактеріоскопічними показниками вони не поступаються продуктам забою курчат контрольної групи. Аналіз даних вказує на доцільність застосування ентеросорбентів (Токсі-Ніл® Плюс Юніке, Мікофікс® Плюс 3.Е, березового активованого вугілля) при комбінованій дії охратоксину А і дезоксиніваленолу.

Ветеринарно-санитарная оценка продуктов убоя цыплят-бройлеров при комбинированном воздействии охратоксина А и дезоксиниваленола и применении сорбентов. *Ю.В. Бойко, Г.В. Бойко, Р.И. Билык, В.Б. Духницкий*

Результаты исследования продуктов убоя цыплят-бройлеров, которым применяли сорбционные препараты при смешанном охра- и дезоксиниваленолотоксикозе, позволяют утверждать, что по органолептическим характеристикам, химическим и бактериоскопическим показателям они не уступают продуктам убоя цыплят контрольной группы. Анализ данных указывает на целесообразность применения энтеросорбентов (Токси-Нил® Плюс Юнике, Микофикс® Плюс 3.Е, березового активированного угля) при комбинированном действии охратоксина А и дезоксиниваленола. ○

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