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ANIMAL HUSBANDRY

Effectiveness of Adding Vitamin E to Broiler Chick Ration at Various Raising Times

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Abstract—The effect of adding vitamin E to the ration of broiler chicks at various age periods on its content in muscle is studied. Chicks of the experimental groups in the last two weeks of raising them received respectively 200, 350, and 450 g of vitamin E per 1 ton of feed. At age 22–35 days, the content of vitamin E in muscles was higher than at age 29–41 days. Doses of 350 and 450 g/t feed were the most effective.

Keywords: broiler chicks, vitamin E, breast and leg muscles

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In connection with a change in the technology of producing broilers, poultry feeding conditions have changed. Postnatal development of poultry was been shortened from 60–70 days in 1970, to 56 in 1980, and to 42 days in 1990–2000. Further shortening of chick raising time—to 35 days and less—is presently underway [1].

As is known, the quality of poultry meat, including the content of vitamins in it, is important [2–4]. With consideration of the antioxidant role of vitamin E, it is often used in foreign practice as a natural antioxidant in high doses, up to 200 g/ton feed, 2–3 weeks before slaughtering the birds in order to create a certain supply in muscles and fat [4].

The purpose of the present investigation was to enrich broiler chick muscles with vitamin E at various age periods of raising them with its different doses in the ration.

METHOD

The investigation was conducted on cross Sibiryak 2 broiler chicks in the vivarium of the Siberian Poultry Husbandry Research Institute from age 1 to 41 days. Seven groups were formed—one control and six experimental. Feeding was done according to the methodological recommendations on working with poultry of the cross Sibiryak 2 [5]. The vitamin E doses and age periods of the birds are given in the design of the experiment. The vitamin E content in breast and leg muscles of chicks in groups II–IV was determined at age 35 days, groups V–VII at age 41 days, and group I (control) at both periods.

Table 1. Design of experiment

Group	Age, days	Feeding characteristics
I (control)	1–41	BR (basic ration)
II	1–21	BR
	22–35	BR + 200*
III	1–21	BR
	22–35	BR + 350*
IV	1–21	BR
	22–35	BR + 450*
V	1–28	BR
	29–41	BR + 200*
VI	1–28	BR
	29–41	BR + 350*
VII	1–28	BR
	29–41	BR + 450*

* Vitamin E dose, g/t feed.

RESULTS AND DISCUSSION

With an increase of the vitamin E dose in the ration from 200 to 450 g/t during the last 2 weeks of raising the chicks, a regularity of its transport from feed into breast and leg muscles with subsequent accumulation in them both at age 35 days and 41 days was observed.

The vitamin E content in breast muscles of 35-day chicks of group II was higher than that of chicks of the control group by 7.88 μg/g (by 196.3%); group III, by 14.27 μg/g (by 274.4%); and group IV, by 12.03 μg/g

Table 2. Vitamin E content in muscles 2 μg/g

Group	Muscles	
	breast	leg
age 35 days		
I (control)	8.18	15.36
II	16.06	24.70
III	22.45	26.49
IV	20.21	28.12
age 41 days		
I (control)	8.23	14.79
V	13.50	23.49
VI	17.08	27.88
VII	13.56	26.83

(by 247.1%) for $P \geq 0.95$. In leg muscles the difference was respectively 9.34 μg/g (160.8%, the difference is not significant); 11.13 μg/g (172.5%); and 12.76 μg/g (183.1%) for $P \geq 0.95$ (Table 2).

The vitamin E content in breast muscles of 41-day group V chicks compared with the control was higher by 5.27 μg/g (by 164.0%, the difference is not significant); group VI, by 8.85 μg/g (by 207.5%); and group VII, by 5.33 μg/g (by 164.8%) for $P \geq 0.95$. The content in leg muscles was respectively higher by 8.70 μg/g (by 158.8%, the difference is not significant); by 13.09 μg/g (by 188.5%); and by 12.04 μg/g (by 181.4%) for $P \geq 0.95$.

For equal doses of vitamin E in the ration, its content in muscles at age 35 days was higher than at 41 days (Table 2). Thus, the content of the vitamin in breast muscles of chicks of group II compared with V was greater by 2.56 μg/g (by 119.0%, the difference is not significant); group III compared with VI, by 5.37 μg/g (by 131.4%); and group IV compared with VII, by 6.65 /g (by 149.0%) for $P \geq 0.95$. The vitamin content in leg muscles of group II chicks compared with V was higher by 1.21 μg/g (by 105.2%, the difference is not significant) and group IV compared with VII, by 1.29 μg/g (by 105.0%) for $P \geq 0.95$. However, in leg muscles of group III chicks aged 35 days, it was insignificantly lower than for group VI chicks.

Thus, on adding vitamin E to the ration in doses of 350 and 450 g/t feed at age 22–35 days, its accumulation in muscles is more effective than on adding it at age 29–41 days.

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