

EFFECT OF VITAMIN C SUPPLEMENTATION ON TRANSPORT
MORTALITY, LIVE WEIGHT AND CARCASS YIELD OF BROILERS*

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Etlık Piliçlerde Vitamin C Verilmesinin Nakliye Ölümlerine, Canlı Ağırlıklarına Kesim Randımanına Etkisi

Özet: Bu çalışmamızda, etlik piliçlerde vit. C verilmesinin nakliye ölümleri, canlı ağırlık ve kesim randımanına etkisi araştırılmıştır. Vit. C, piliçlerin yüklenmesinden 12 saat önce 1500 ppm düzeyinde içme sularına karıştırılarak verilmiştir.

Vit. C verilen gruplarda nakliye sırasında ölümlerin ortalama değeri % 0,09 düzeylerinde seyretmişken bu oran kontrol gruplarında % 0.21 olarak saptanmıştır. Ancak bazı vit. C verilen gruplarda ölüm oranları analog kontrol gruplarından daha fazla gerçekleşmiştir.

Vit. C verilen gruplarda canlı ağırlık ortalaması daha yüksek (ortalama 1.950 gr.) bulunmuşken bu değer vit. C verilmeyen kontrol gruplarında 1.810 gr. olarak gerçekleşmiştir.

Karkas verim (kesim randımanı) değerleri açısından beklenenin aksine vit. C verilen gruplarda kesim randımanı daha düşük gerçekleşmiştir (% 74.34 vit. C verilen gruplarda ve % 80.64 kontrol gruplarında).

Summary: In this experiment, the effect of vit. C supplementation on transport mortality, live weight and carcass yields of broilers has been examined. Supplementation was done by 1500 ppm level in the drinking water, 12 hours prior to loading of the birds.

Average transport mortality was around 0.09 percent in vit. C-added groups while it was 0.21 percent in control groups, however the transport mortality in some of vit. C-added groups was higher than their analogue control groups.

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The live weights of vit. C-added groups were higher (average 1.950 gr.) than control groups (average 1.810 gr.).

From the point of carcass yield, contrary to previous expectation, the vit. C added groups showed a decreased yield of 74.34 percent while it was 80.64 percent in control groups.

Introduction

Since the birds produce their own vitamin C from adrenal tissues, feeding of vit. C to them would be senseless (7), unless the status of the birds doesn't change by feeding, management, climate etc. Any change in endogen biosynthesis of vit. C due to factors mentioned above would make the feeding of exogen vit. C necessary (18). As it is reported by Krautmann (1989) (8), endogen vit. C production might not be sufficient under acute condition of stress.

The reported concentration of vit. C in adrenal tissues is around 178 mg/100 gr. tissues which is extremely higher than in any other parts of the body, therefore, any change in vit. C concentration in these tissues is considered as the birds are in condition of stress (15, 23).

Many others have reported, the increasing in ACTH secretion and accordingly decreasing in vit. C concentration in adrenal tissues during stress (3, 6, 9, 10, 12, 17).

It has been shown experimentally that, under all kind of stress exogen vit. C has ameliorated the adverse effect of stress (13, 14). This mechanism associated with vit. C may inhibit steroidogenesis (14, 16). In this aspect, the most spectacular reports have been done in mortality decrease by vit. C supplementation (14, 18, 19, 20). These same findings have been reported also in laying hens (1, 2).

In addition, decreasing in plasma K level is also associated with plasma steroid concentration increased under stress which leads to dehydration (14). Giving vit. C may help to keep plasma K level as it's initial concentration (14), this mechanism associated with decreased changing in intra-extracellular electrolyte flowing resulted in less hydration (14).

Since the vit. C exhibits anti-oxidant character, its supplementation under condition of stress inhibits rupture of cell membranes (13, 14, 23) resulting in improvement of carcass yield (18).

The period of time between handling in the farm and slaughtering of the broilers in slaughter house resulted weight loss and lowered yield (21). These authors however, couldn't observe absolute positive improvement in live weight of birds given vit. C prior to slaughtering. Farr et. al. (1988) (4) reported an increased farm weight after adding of vit. C in broilers.

Guarles and Adrian (1989) (21) have also reported, an increase in eviscerated yield after vit. C supplementation.

Materials and Methods

In our experiments, the vit. C was aquired from Roche and added into drinking water 12 hrs. prior to catching. Supplementation was done once by a 1500 ppm concentration.

Generally, 6.000 – 10.000 birds capacity flocks were selected which were reared on the floor. At the time of application of vit. C the houses were divided into two groups, one of these was considered as control while the other as supplemented group.

Totally, seven times double delivery from seven different farms were realized and each double delivery (one is control, the other is experiment group) were done in the same time with same handling persons, beside this, the loading process was also the same in each double groups in order, to avoid other influences such as catching, loading etc. reported by Gürer et. al. (1990) (5).

Transport mortality, live weight and chilled carcass yield were determined in each doubles separately. Slaughtering was done at 48–50 days of age. Hybro, Ross 208, and Ross pm3 breed were used.

The trucks were weight with electronic scale (200 grs. sensibility) and the slaughtered birds were weight also with electronic table scale one by one.

Results

The average live weights of groups are shown in Table 1; The vit. C-added groups have had 7.5 percent higher avarage body weight than control groups.

In term of transport mortality, it was 0.09 percent in vit. C-added groups while 0.21 percent in control groups (Table 2).

Table 1. Live Weights (average grs)

Groups	grs. \bar{X}	S \bar{x}
Vit. C-added groups	1.950	109
Control Groups	1.810	108

Table 2. Transport Mortality (%)

Groups	Mortality %
Vit. C added groups	0.09
Control groups	0.21

The realized carcass yield in vit. C added groups was lower than in control groups (74.34 percent in vit. C added groups and 80.64 percent in control groups) (Table 3)

Table 3. Carcass Yield (%)

Groups	Yield %
Vit. C added groups	74.34
Control Groups	80.64

Discussion and Conclusion

Adding of 1500 ppm vit. C to the drinking water for at least 12 hrs. prior to pickup for slaughtering resulted in a significant increase in live weight ($p < 0.01$) (Table 1). The same result was also found by Farr et. al. (1988) (4) and it can be attributed directly to the effect of vit. C.

However the average differences in live weights of the analogues were found to be 8.3 percent, it reached a minimum with 2.5 percent in the fifth and a maximum with 21.1 percent in the second experiment (Fig 1). That much differences in the magnitude of live weight can not be expressed by only vit. C supplementation so probably miss grouping of birds by farmers might also have had an influence on it.

Finally, the heigher live weights in vit. C-added groups might be explained by vit. C's capability to reduce tissue hydration and therefore avoid excessive weight loss taken into account the positive effect of vit. C observed in plasma electrolytes under stress condition (21).

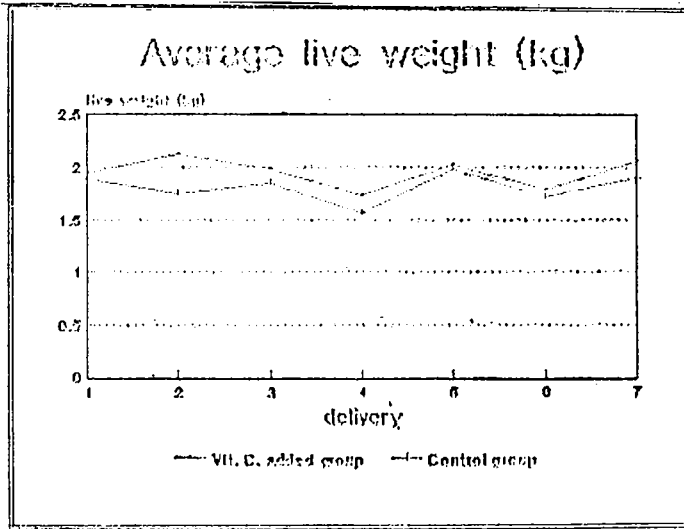


Fig. 1. Average live weight.

Table 2, shows the average transport mortalities in groups. However it is far more higher in the control groups than in the vit. C added groups, this response was not observed in experiment 3, 5 and 6 (Fig 2). Finally supplementation of vit. C has not altered the transport related mortality significantly. These findings are not in agreement with previous reports (14, 18, 19, 20).

The most spectacular findings were observed in cold chilled yields of broilers (Table 3). Although Quarles and Adrian (1989) (21) reported increased carcass yield after supplementation of vit. C in broilers, this positive effect was not observed in our experiments at all. Fig 3, shows yields of individual groups. In the 5th trial no remarkable differences could be found. All other trials showed that the vit. C-added groups had far less yield compared to control groups. However it could be thought that, lowered carcass yield could be related to higher live weight of birds of vit. C added groups, in the study of Gurer et. al. (1990) (5) not any relation between live weight and yield has been found in broilers.

According to the trials, the findings suggest that, vit. C supplementation has become effective in extracellular liquid maintaining and increasing the extracellular water binding capacity and electrolyte balance under condition of stress.

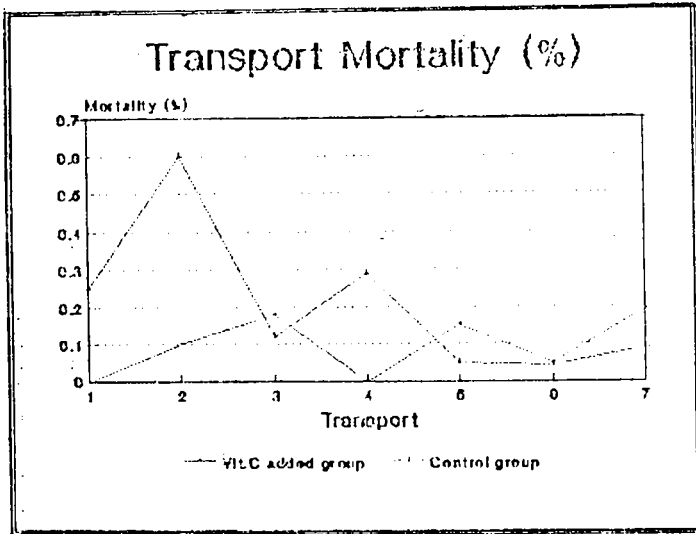


Fig. 2. Transport Mortality

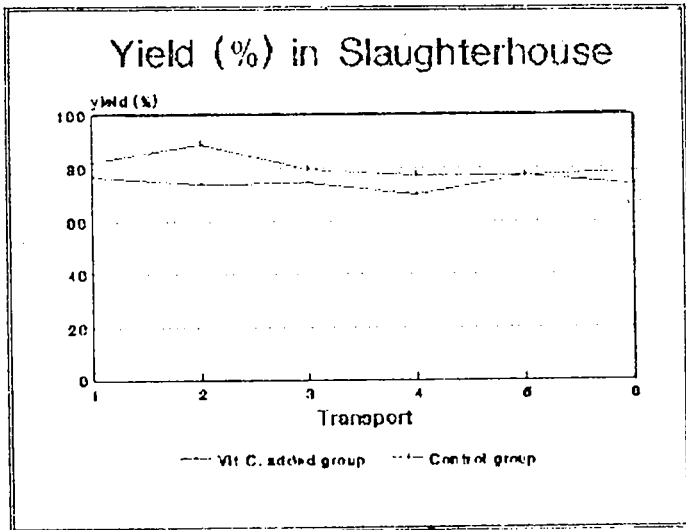


Fig. 3. Carcass Yield

Finally, compared to non-supplemented control groups, vit. C added groups have lost more body weight via extracellular liquid lost through bleeding, eviscerating etc. during total processing. This finding is contrary to the report of Krautmann B.A. (1989) (8), who described an increased yield by 1000 ppm vit. C administration via drinking water 24 hrs. before loading.

As a result of our experiments, adding vit. C at 1500 ppm into the drinking water 12 hrs. prior to loading brings advantages for farmers because of increased live weight and disadvantages for slaughterhouses because of decreased yield.

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