

## Effects Of Anise Supplement To Ration Of Beef Cattle On Performance And Some Blood Parameters

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### ABSTRACT

In the current study, 14 male Holstein calves aged 11-12 months were used from the Usak Cattle Breeders Association Research Farm. In this study lasting for 60 days, 14 cattle were used and divided into 2 groups as control and treatment. The feeding method, which is routinely applied in the enterprise, was applied to the control group. In addition to the same ration, 250 gr/head/day crushed anise seed powder feed additive was poured on the feed of the treatment group consisting of the other 7 animals. The live weight yields of all animals were weighed on the 30th and 60th days of the study, the individual daily live weight gains of the animals were calculated. Animals in the treatment group gained 286 gr more live weight per day. Some blood parameters (glucose, total protein, albumin, AST, GGT, cholesterol, TAS, TOS) were examined in blood samples taken from the tail vein at the beginning and end of the study. In the study, it was determined that the statistical difference between the control and experimental groups in terms of fattening performance and blood parameters was insignificant. The results of the current study have revealed that more comprehensive studies should be carried out on the addition of anise seed powder to cattle feed.

**Keywords:** Anise seed powder; Beef cattle; Blood parameter; Fattening performance; Oxidant-antioxidant balance

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### Besi Sığırlarına Rasyona Anason İlavesinin Performans ve Bazı Kan Parametreleri Üzerine Etkileri Etkisi

### ÖZ

Bu çalışma Uşak Damızlık Sığır Yetiştiriciler Birliği Araştırma Çiftliğinde 11-12 aylık yaşta 14 baş erkek Holştayn dana kullanılmıştır. 60 gün süren çalışmada 14 adet sığır kullanılmış olup kontrol ve deneme grubu olacak şekilde 2 gruba ayrılmıştır. Kontrol grubuna işletmede rutin olarak uygulanan besleme yöntemi uygulanmıştır. Diğer 7 hayvandan oluşan deneme grubuna ise aynı rasyona ilave olarak 250gr/baş/gün anason tohumu tozu yem üzerine dökülerek verilmiştir. Tüm hayvanların canlı ağırlık verimleri denemenin 30. ve 60. günlerinde tartılmıştır ve hayvanların bireysel günlük canlı ağırlık artışları hesaplanmıştır. Deneme gurubundaki hayvanlar günlük 286 g daha fazla canlı ağırlık kazanmışlardır. Denemenin başında ve sonunda kuyruk venasından alınan kan örneklerinde bazı kan parametreleri (glikoz, total protein, albümin, AST, GGT, kolesterol, TAS, TOS) incelenmiştir. Yapılan çalışmada elde edilen verilere göre kontrol ve deneme gurubu arasında besi performansı ve kan parametreleri bakımından istatistiksel olarak önemli bir fark bulunmadığı belirlenmiştir. Sonuç olarak bu çalışma ile sığır yemlerine anason tohumu ilavesiyle ilgili daha kapsamlı çalışmaların yapılması gerekliliği ortaya çıkmıştır.

**Anahtar kelimeler:** Anason; Besi sığırı; Kan parametre, Besi performansı; Oksidan-antioksidan denge

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## INTRODUCTION

Nowadays, in order to meet the needs of the increasing world population, ways to obtain more efficiency from a unit animal are being investigated. With a conscious feeding system, high efficiency can be guaranteed and the most economical product acquisition environment will be provided. For this reason, a sector called "feed additives" was formed in order to meet the high and quality nutrient requirements and to increase the yield and feed utilization of the animal. The activation of resistant microorganisms, the accumulation of metabolic residues related to the products in the animal organism and the possibility of adversely affecting human health made the use of antibiotics as feed additives, which increase feed utilization and thus animal productivity, questionable. For this reason, the use of ionophore, antibiotics and similar products in animal feeding has been prohibited since 2005 with the decision taken by the European Council (Jouany and Morgavi, 2007; Özen et al., 2005; Tuncer, 2007).

As a result of these prohibitions, it has come to the fore that medicinal and aromatic herbs used in many areas can be alternative due to their various benefits. As a result of recent studies, it has been stated that medicinal and aromatic plants in animal nutrition contribute to increased appetite, stimulation of digestion, body weight gain, improvement in feed utilization rate, improvement in carcass quality, and the formation of a microflora suitable for digestion and health by preventing the effects of pathogenic microorganisms in the intestine (Güler and Dalkılıç, 2005; Kamel, 2001; Tipu et al., 2006). At the same time, this group, which is extremely effective in terms of being an alternative to antibiotics, has been put into use more effectively, making it possible to obtain animal products that are more economical and positive in terms of consumer health (Kutlu, 2001).

Nowadays, there is an increasing interest in medicinal and aromatic herbs and herbal extracts derived from them. The number of studies conducted to better define these plants, to determine the safe use amounts in animal production and the amount of mixture as feed additives is increasing worldwide with each day.

(Esfahani et al., 2016). However, more research is needed in this area. Some studies have been conducted on how to benefit from the carminative, antiviral and antifungal effects of the anise plant (*Pimpinella anisum* L.), one of these medicinal and aromatic plants, and how it can be used as an additive in both food and animal nutrition due to these important properties (Göktaş and Gıdık, 2019).

Anise is a one-year herbaceous plant belonging to the Apiaceae family. There are a total of 29 species, 8 of which are endemic, belonging to *Pimpinella* genus in Turkey (Davis, 1972). It has aromatic and therapeutic properties due to its precious essential oil in the secretory channels of anise seeds.

Anise is an important spice and medicinal herb used in the pharmaceutical, perfume and food industries. Its essential oil has been reported to have antispasmodic, antioxidant, germicidal properties, to be used as insecticide or repellent in agricultural applications, and to have antifungal properties. In addition, anise is used in dyspeptic complaints, in the treatment of colds and as a mild expectorant (Haşimi et al., 2014). In addition, it has been reported that it facilitates digestion due to its diuretic and carminative properties, has an antispasmodic effect, and, is used in the treatment of mild digestive disorders, nausea, colic, dyspeptic headache and bloating (Janahmadi et al., 2006).

In the current study, it was aimed to reveal the effects of anise plant (*Pimpinella anisum* L.), one of the medicinal and aromatic plants, on some blood parameters, blood oxidant antioxidant balance and body weight gain as an additive in animal feed.

## MATERIAL AND METHOD

The current research was carried out at the Uşak Cattle Breeders Association Research Farm, following the approval of the Uşak University Animal Experiments Local Ethics Committee (USAKHADYEK 2020 / 02-01).

In this study, 14 male Holstein calves aged 11-12 months were used. Although the enterprise is engaged in milk production, it was used to shelter and feed the male material. On average, 11.5 kg of roughage and 8.6 kg of concentrate were given in the morning and evening in the fattening (Table 1 and Table 2).

**Table 1.** Nutrient Composition of Coarse and Concentrated Feeds Used in the Study (in Dry Matter, %)

Feed materials	Cattle Fattening Feed,14HP, 2800 ME	Barley grain, crushed	Corn silage, 30-35% KM	Sugar beet pulp	Sunflower residues, 32% HP
KM Feed %	88.35	91.00	32.00	17.00	92.20
ME Mcal/kg	3.01	2.92	2.33	2.76	2.40
NEL Mcal/kg	1.69	1.76	1.38	1.38	1.40
HP KM%	15.90	12.40	8.80	11.20	35.60
RUP HP%	31.85	18.10	33.30	66.20	18.40
HY KM%	2.49	2.20	3.20	2.10	1.50
HK KM%	7.30	2.90	4.30	4.70	7.30
NDF KM%	21.29	20.80	45.00	45.80	36.00
ADF KM%	9.10	7.20	28.10	23.10	26.00
Ca KM%	1.19	0.06	0.28	0.87	0.48
P KM%	0.56	0.39	0.26	0.10	1.00

**Table 2.** Beginning and ending fattening rations

	Beginning fattening ration (First Month)	Ending fattening ration (Second Month)
Corn silage, 30-35% KM	11.10	11.92
Wheat straw	2.38	1.47
Cattle Fattening Feed,14HP, 2800 ME	3.03	5.00
Barley grain, crushed	0.42	0.41
Sugar beet pulp	0.40	1.96
Sunflower residues	0.20	0.56
The total weight of the ration, kg	18.97	21.32
KM kg of rations	9.92±0.01	10.66±0.01
ME Mcal/kg KM of rations	2.25	2.45

The animals in the study were weighed and assigned to the control and treatment groups in such a way that the average body weights of the animals in the groups would be equal.

The feeding method (morning- evening), which is routinely applied in the enterprise, was applied to the control group. In addition to the same ration, 250gr / head / day crushed anise seed powder feed additive was poured on the feed of the treatment group consisting of the other 7 animals in the morning.

The live weight yields of all animals were weighed monthly with the scale in the enterprise and the individual daily live weight gains of the animals were calculated. At the same time, some blood parameters (glucose, total protein, albumin, AST, GGT, cholesterol, TAS, TOS) were examined in blood serum samples at the beginning and end of the study.

Blood samples were taken from the sub-caudal vein (vena coxygea mediana) of the animals in the middle and at the end of the study. The samples taken were centrifuged in the centrifuge

for 5 minutes; the extracted serums were placed in eppendorf tubes of 2 ml and stored in a deep freezer at -18 ° C until the date of analysis. After waiting to dissolve at room temperature and reach the appropriate analysis temperature, some blood parameters (glucose, total protein, albumin, AST, GGT, cholesterol) were measured using a BT-3000 Plus auto analyser TAS levels and TOS levels in blood samples were determined at Uşak University Scientific Analysis And Technological Application And Research Center Laboratory using the Elisa device according to the methods reported by Erel (2004, 2005).

For the statistical calculations of the data of the groups obtained in the study and the significance of the differences between the mean values of the groups, Mann-Whitney U test was conducted. The level of significance was set to be  $P > 0.05$ . For this purpose, SPSS 23.0 program package was used.

## RESULTS

At the end of the treatment, it was observed that the coarse and concentrated feed to which anise seed powder was added was consumed in a shorter time in the treatment group. As a statistical evaluation could not be made due to group feeding, it could not be evaluated whether there was a difference between the groups in terms of feed consumption.

Table 3 shows that weight gain results obtained in different days of the study there were no

statistically significant difference between the groups in terms of body weight gains calculated based on the weighing periods.

The difference in mean weight gains calculated on the basis of the weighing periods was insignificant in the first and second month. While the difference between the means was 3.28 kg in the first month, it was 8.57 kg in the second month. It was determined that the live weight gains of cattle fed with anise seed powder added feed were better (Table 4).

**Table 3.** Weight gain results obtained in different days of the study, kg

Groups	Weighing Days	$\bar{x}$	$S\bar{x}$	Mean Runk	Sum of Rank	U	Z	P
0-31	Control	443.43	9.21	6.00	42.00	14.000	-1.357	P>0.05
	Anise seed	443.29	12.01	9.00	63.00			
32-60	Control	477.43	8.67	4.86	34.00	6.000	-2.38	P>0.05
	Anise seed	485.86	12.75	10.14	71.00			

P>0.05 is considered to be insignificant

**Table 4.** Mean weight gains obtained in different days of the study

Groups	Weighing Days	$\bar{x}$	$S\bar{x}$	Mean Runk	Sum of Rank	U	Z	P
0-31	Control	31.29	1.82	6.00	42.00	14.000	-1.357	P>0.05
	Anise seed	34.57	1.05	9.00	63.00			
32-60	Control	34.00	2.89	4.86	34.00	6.000	-2.38	P>0.05
	Anise seed	42.57	1.42	10.14	71.00			

P>0.05 is considered to be insignificant

**Table 5.** Daily live weight gains obtained in different days of the study, kg

Groups	Weighing Days	$\bar{x}$	$S\bar{x}$	Mean Runk	Sum of Rank	U	Z	P
0-31	Control	1.042	0.05	4.86	34.00	23.500	-0.128	P>0.05
	Anise seed	1.152	0.03	10.14	71.00			
32-60	Control	1.133	0.09	6.50	45.50	17.500	-0.895	P>0.05
	Anise seed	1.419	0.05	8.50	59.50			

P>0.05 is considered to be insignificant

As seen in table 5 was determined that the difference in the calculated daily live weight gains was insignificant. However, it was determined that the daily live weight gains of cattle fed with anise seed powder added feed (1.419) were higher than those in the control (1.133) group.

The group averages of the results of glucose, albumin, total cholesterol, GGT, AST, and total protein analyzes obtained from blood samples taken from male fattening cattle in two separate periods in the control and treatment groups are given in Table 6 and Table 7.

**Table 6.** Results of Some Biochemical Analyses Conducted on the Blood Samples Taken at the Beginning of the Study (n=14)

Parameters	Grups	$\bar{x}$	$S\bar{x}$	Mean Runk	Sum of Rank	U	Z	P
Glucose, mg/dl	Control	93.40	2.24	6.64	46.50	18.500	-0.767	P>0.05
	Anise seed	94.42	3.06	8.36	58.50			
Albumin mg/dl	Control	3.52	0.08	4.36	30.50	2.500	-2.827	P<0.05
	Anise seed	3.54	0.05	10.64	74.50			
Total Cholesterol, mg/dl	Control	100.12	3.65	10.93	76.50	0.500	-3.07	P<0.05
	Anise seed	92.16	4.30	4.07	28.50			
GGT, mg/dl	Control	18.54	1.97	8.71	61.00	16.000	-1.086	P>0.05
	Anise seed	17.90	1.15	6.29	44.00			
AST, mg/dl	Control	72.18	3.07	7.95	66.50	10.500	-1.79	P>0.05
	Anise seed	70.67	3.64	5.50	38.50			
Total Protein, mg/dl	Control	6.74	0.18	7.36	51.50	23.500	-0.128	P>0.05
	Anise seed	6.75	0.12	7.64	53.50			
TAS (mmol Trolox Ekvivalent/L)	Control	0.12	0.11	8.29	58.00	19.000	-0.709	P>0.05
	Anise seed	0.20	0.01	6.71	47.00			
TOS( $\mu$ mol H <sub>2</sub> O <sub>2</sub> Ekvivalent/L)	Control	0.10	0.01	8.71	61.00	16.000	-1.086	P>0.05
	Anise seed	0.09	0.12	6.29	44.00			

P>0.05 is considered to be insignificant

**Table 7.** Results of Some Biochemical Analyses Conducted on the Blood Samples Taken at the End of the Study (n=14)

Parameters	Grups	$\bar{x}$	$S\bar{x}$	Mean Runk	Sum of Rank	U	Z	P
Glucose, mg/dl	Control	42.30	1.90	4.000	28.00	0.000	-3.148	P<0.05
	Anise seed	51.82	4.40	11.00	77.00			
Albumin mg/dl	Control	3.50	0.08	7.29	51.00	23.000	-0.193	P>0.05
	Anise seed	3.52	0.07	7.71	54.00			
Total Cholesterol, mg/dl	Control	104.11	3.69	11.00	77.00	0.000	-3.151	P<0.05
	Anise seed	90.15	4.35	4.00	28.00			
GGT, mg/dl	Control	18.50	1.90	8.93	62.50	14.500	-1.285	P>0.05
	Anise seed	17.70	1.11	6.07	42.50			
AST, mg/dl	Control	72.22	3.09	9.50	66.50	10.500	-1.799	P>0.05
	Anise seed	70.44	3.66	5.50	38.50			
Total Protein, mg/dl	Control	6.76	0.21	7.07	49.50	21.500	-0.385	P>0.05
	Anise seed	6.79	0.10	7.93	55.50			
TAS (mmol Trolox Ekvivalent/L)	Control	0.61	0.01	10.29	72.00	5.000	-2.492	P>0.05
	Anise seed	0.55	0.01	4.71	33.00			
TOS( $\mu$ mol H <sub>2</sub> O <sub>2</sub> Ekvivalent/L)	Control	0.11	0.01	8.00	56.00	21.000	-0.447	P>0.05
	Anise seed	0.10	0.01	7.00	49.00			

P>0.05 is considered to be insignificant

It has been determined that the amount of anise seed powder added to the food reduces the amount of glucose and cholesterol in the blood and the difference between them is significant. In addition, it was determined that anise reduced the total antioxidant status and the amount added was not sufficient (Table 7).

## DISCUSSION

The present study was conducted to determine whether anise, which is among the feed additives used to increase the feed utilization the quality of the products obtained, to ensure the healthy breeding of animals and to reduce the cost of the obtained product, has any effect on the increase in live weight.

In this study, in the blood samples taken as a result of the trial period lasting 60 days; It was found that adding anise to the food decreased blood levels from 94.42 mg / dl to 51.82 mg / dl in glucose level. It was found that the cholesterol level in the blood decreased from 92.16 mg / dl to 90.15 mg / dl. (Table 6,7). This result shows that adding 250gr / head / day anise to cattle feed has a positive effect on blood cell values of animals. In addition, while the difference between live weight averages in the first month was 3.28, it was 8.57 kg in the second month. It was determined that the live weight gains of cattle fed with anise added feed were better.

In previous studies performed by adding plant or herbal extracts to diet as feed additives, it was reported that medicinal plants or their extracts may cause changes in blood levels of some biochemical parameters in ruminant animals (Raghuvansi et al., 2007, Mahgoub et al., 2008)

In the current study, it was determined that while the effect of adding anise to the diet on blood levels was insignificant as a result of the analysis of the blood samples taken at the end of the 60-day application period, it was found to have an effect on body weight gain (Tables 5, 6, 7). In a recent study, Iftikhar et al. (2017) added anise to the diets of Damani goats and examined the blood biochemical profile and milk quality. As a result of the study, it was determined that Anise supplement increased feed intake, body weight gain, milk yield and significantly changed its composition. It has been determined that anise increases glucose and protein levels in the blood while decreasing cholesterol and triglyceride levels. The results obtained in the study are differend from the results of the present study. Cardoza et al. (2006) also found that feed intake and live weight of the calves with feed added anise increased. This finding concurs with the findings of the present study.

Kaya (2018) examined the effect of an herbal feed additive (Yumesa-Meat Plus) on the performance, some blood parameters and carcass characteristics in beef cattle. He divided 20 Holstein male calves into 2 groups and conducted his treatment for 90 days. Animals in the treatment group gained 177 g more live weight per day. There was no statistically significant difference between the control and experimental groups in terms of some blood parameters and carcass characteristics. The findings obtained in terms of protein, GGT and albumin parameters are in accordance with the study. The results of the present study supported the results of Kaya (2018).

In the study conducted by Gümüş and Şehu (2016), a control group and a yeast group were formed with 16 male Holstein breed cattle aged 5-6 months and live yeast culture was added to the diet of the yeast group cattle for 120 days. It was determined that the difference between the groups in terms of body weight gain was not significant. This finding is supports the relevant finding of the present study.

In the study conducted by Özcan C. (2015) on the use of wild arugula plant in ruminant feeding of a total of 32 Anatolian Merino lambs aged 3–4 months, it was determined that the difference between the groups in terms of live weight gain was not significant. This result concurs with the finding of the current study. In the study, it was also found that there was no significant difference in terms of blood parameters (glucose, total protein, cholesterol, AST). The fact that there is no difference between the groups in other parameters except glucose and cholesterol is consistent with current study.

In the study conducted by Sallam et al. (2018) by adding Anise seed and active dry yeast to the rations of Egyptian buffaloes; 4 groups were compared: a control group, a treatment group whose feed 50 gr anise seed was added to, a treatment group whose feed 20 gr active dry yeast was added to and a treatment group whose feed 10 gr active yeast and 25 gr anise seed were added to. Total cholesterol and triglyceride concentrations were found to have decreased in the treatment groups ( $P < 0.01$ ). The finding of a decrease in cholesterol in the blood is in accordance with the study.

In their study conducted on 18 Holstein cows in Baghdad University Animal Farm to examine the effect of anise on heat tolerance and some blood parameters, Shwayel and Al-Mafraji (2020) formed three groups: a control group, a treatment group whose feed 30 gr anise was added to and a treatment group whose feed 30 gr anise s processed in formaldehyde was added to. As a result, it was determined that the

addition of anise did not have any effect (triglyceride, GPT, HDL and heat tolerance) in the summer months in the treatment groups. The fact that there is no difference between the groups in other parameters except glucose and cholesterol is consistent with current study.

Esfahani et al. (2016) examined the effect of anise seed on performance, digestibility and infectious microbes in the intestines of lactating calves. A total of 24 Holstein calves were divided into three groups: a control group, a treatment group whose feed 0.25% anise was added to and a treatment group whose feed 0.5% anise was added to. The study lasted 60 days. As a result, it is compatible with the present study in terms of better live weight gain in groups fed with anise supplemented feed.

Probably, when anise seed powder is added to the feed, it adds more flavor to the feed content and causes the cattle to consume more and more fondly. In this case, more weight gain is provided in live weight.

## CONCLUSION

In recent years, as consumers have turned towards healthy and safe food consumption, the use of medicinal and aromatic plants has come to the fore in the production of animal products, especially as yield enhancers.

Considering the average weight gains and daily live weight gains (286 gr) obtained in the second month in the treatment group whose feed anise seed powder was added to and low cost of anise, it can be argued that anise can help animal breeders to increase their income. In addition, observing that animals that consume anise seed powder added feed are calmer is indication of another positive effect of aromatic plants on beef cattle.

It has been concluded that anise seed powder can be used as an alternative feed additive to synthetic products to meet consumer demand in animal products, but this potential should be confirmed with different ruminant species and longitudinal studies. If the findings to be obtained in such studies support the findings of the current study, it will be possible for animal breeders and businesses producing animal feed additives to use anise seed powder and in this way the use of anise seed powder in ruminant animals will be more widespread.

**Conflict of interest:** The authors declared that there is no conflict of interest.

**Ethical Approval:** The current research was carried out at the Uşak Cattle Breeders Association Research Farm, following the approval of the Uşak University Animal

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