KRMIVA

EFFECT OF AROMA SUPPLEMENTATION IN RABBITS

DJELOVANJE DODATKA AROME U KUNIĆA

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SUMMARY

The 45d experiment was conducted to study the effect of aroma supplementation to the diets on growth performance, feed efficiency and carcass characteristics of fattening New Zealand White rabbits. There were two treatment groups: one without a supplement and the other with 0.03% aroma TIMIKO. The body weight gain, feed intake and utilization, and carcass characteristics were determined.

Rabbits fed the aroma diet grew faster (P<0.001) than the rabbits fed the control diet (37.3 v/s 34.0 g, respectively). TIMIKO addition increased average daily feed intake by 7.5% (144 v/s 134 g, respectively) and improved feed conversion ratio by 4.0%. No differences in dressing percentage were observed.

Key words: fattening rabbits, nutrition, aroma supplementation, performance

INTRODUCTION

Nowadays livestock undergoes significant changes. The limitations of the use of antibiotics as growth promoters in poultry, pigs and even rabbits make it necessary to find new additives which can guarantee a required performance level, improve the health status of the animals as well as the quality of the animal production. This has led to development of different products used as food additives such as enzymes, probiotics, organic acids, plant extracts and also supplements improving food flavor and palatability. Numerous studies show that some plant extracts used as food additives make the food flavor pleasant and hence improve feed consumption. Besides, these additives have beneficial influence on the animal performance because of the active substances they contain (Kozelov et al., 2003; Zivkovic et al., 2003; Kistanova et al., 2005; Surdjiska et al., 2005). At the same time a wide range of plant extracts have antimicrobial, coccidiostatic and antihelminthal effect and therefore might have a positive influence on the animal health condition (Wenk et al., 2002; Azaz et al., 2004; Chorianopoulos et al., 2004; Green, 2004).

The objective of this experiment was to study the effect of aroma addition to the diets on growth performance and feed efficiency of fattening rabbits.

MATERIALS AND METHODS

An experiment was conducted at the Experimental Station of the Institute of Animal Sciences – Kostinbrod on 40 New Zealand White rabbits (equal

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number of males and females). The average initial age of the rabbits was 45 days and the average initial live weight was 1.4 kg. The experimental period was 45 days. The rabbits were allotted to the control or the experimental group on the basis of live weight, sex and age. Rabbits from the first (control) group were fed the basal pelleted diet whose composition and nutrition value are shown in Table 1. The animals from the second (experimental) group received the same diet supplemented with 300 g/tone TIMIKO. TIMIKO is product of IREKS AROMA, Zagreb, Croatia and contains essential oil of *Thymus vulgaris*. Diets were pelleted at the Experimental Station of the Institute of Animal Sciences – Kostinbrod by the laboratory pellet-press (California pellet-mill, USA)

Table 1. Composition and nutrition value of complete feed

Tablica 1. Sastav i hranidbena vrijednost potpunog obroka

Ingredient - Sastojci	%
Oats - Zob	23.14
Barley - Ječam	10.00
Wheat bran - Pšenične posije	15.00
Alfalfa meal - Lucernino brašno	30.00
Soybean meal - Sojino brašno	12.00
Sunflower meal - Suncokretovo brašno	6.00
Salt - Sol	0.40
Limestone - Vapnenac	0.80
Dicalcium phosphate - Dikalcij fosfat	1.00
Vitamin premix - Vitaminski premiks	0.50
DL-methionine - DL-metionin	0.06
Acid-lac	0.30
Kembind	0.50
Toxibind	0.30
The mixture contains - Smjesa sadrži:	
Crude protein - Sirove bjelančevine, %	17.80
Crude fiber - Sirovu vlakninu, %	15.70
Calcium - Kalcij, %	1.15
Phosphorus-total - Ukupni fosfor, %	0.63
Lysine - Lizin, %	0.82
Methionine+cystine - Metionin + cistin, %	0.65
Metabolizable energy Metabolizirajuću energiju, kcal/kg	2300

The rabbits were housed in one-storey cages of four rabbits each. Each group was replicated with five cages. Throughout the experimental period the animals had ad libitum access to feed and water.

Rabbit live weight at the beginning of the trial, at 65d and at the end of the experimental period was recorded. Feed intake was recorded daily for each cage. At the end of the trail all rabbits were slaughtered and dressing percentages were determined and meat samples were collected for chemical analyses.

The research data analyses were made by usual variation statistical methods and Student`s *t*-test was used to compare means.

RESULTS AND DISSCUSION

The effect of TIMIKO supplement to diet on rabbit live weight is shown in Table 2. The animals from the group receiving TIMIKO had higher live weight compared with those from the control group at both 65 days of age and at the end of the experimental period, by 4.8 and 5.0% ($P<0.01$), respectively.

The results obtained for the average daily gain (Table 3) during the separate periods showed that from 45 days of age to 65 days of age the ADG of the treated rabbits was 47.6 g and of the controls – 41.6 g ($P<0.001$). These values were 29.1 and 25.7 g in the period from 65 to 90 days of age. Over the whole experimental period rabbits from the second group had significantly ($P<0.001$) higher ADG compared with the control group (37.3 v/s 34.0 g).

The total feed intake was about 7,5 %, higher for rabbits fed the TIMIKO supplemented diet than for those fed the basal diet without additive (Table 4) – 6,490 v/s 6,038 kg. The average daily feed intake was 134 g for the control group and 144 g for the experimental group.

There was a tendency for the feed efficiency to improve in the group, receiving supplement by 4.0 % in comparison with the group without aroma addition. Feed efficiency ratio (expressed as kg feed intake per kg weight gain) for the control rabbits was 4.04 kg and for the experimentals 3,877 kg (Table 4).

Table 2. Rabbit live weight
Tablica 2. Živa vaga kunića

Items	Control group Kontrolna skupina	Experimental group (TIMIKO) Pokusna skupina (TIMIKO)	%
Initial live weight - Početna živa vaga, кg	1.427 ± 0.16	1.424 ± 0.17	
Live weight at d65 - Živa vaga na d65, кg	2.268 ± 0.16	2.376 ± 0.16	104.8
Live weight at d90 - Živa vaga na d90, кg	2.956 ± 0.17	3.103 ± 0.16**	105.0

** P<0.01

Table 3. Average daily gain
Tablica 3. Prosječan dnevni prirast

Items	Control group Kontrolna skupina	Experimental group (TIMIKO) Pokusna skupina (TIMIKO)	%
ADG from d45 to d65 - ADG od d45 do d65, g	41.6 ± 3.72	47.6 ± 4.56***	114.4
ADG from d65 to d90 - ADG od d65 do d90, g	27.8 ± 2.11	29.1 ± 2.53	105.7
ADG from d45 to d90 - ADG od d45 do d90, g	34.0 ± 2.98	37.3 ± 2.23***	109,7

*** P<0.001

Table 4. Feed intake and feed utilization
Tablica 4. Unos hrane i iskorištenost hrane

Items	Control group Kontrolna skupina	Experimental group (TIMIKO) Pokusna skupina (TIMIKO)	%
Total feed intake - Ukupan unos hrane, kg	6.038 ± 0.36	6.490 ± 0.47	107.5
Average daily feed intake, kg Prosječan dnevni unos hrane	0.134 ± 0.01	0.144 ± 0.01	107.5
Feed efficiency, kg feed/kg gain Djelotvornost hrane, kg hrane/ kg prirasta	4.040 ± 0.31	3.877 ± 0.33	96.0

The data from carcass analyses made at the end of the experiment are shown in table 5. There were no significant differences between the control and the experimental groups in values for dressing percentages.

In table 6 the data for chemical composition of rabbit meat are presented. The group fed TIMIKO had higher (P<0.05) crude protein content in the meat and the crude fat content was decreased by 27.0% in the experimental group than in the control group without supplement.

The results obtained in this investigation are in accordance with those reported by Surdjiska et al. (2005) who in the experiment with growing rabbits fed Vemoherb (mixture of plant extracts) found that live weigh and average daily gain were increased by 3.3% and 5.5% respectively, and feed convertion was improved by 9.0% in comparison with the control group.

Our results show some positive effects of TIMIKO addition to the diet of fattening rabbits. In many investigations carried out to study the effect of different plant extracts the positive results were related to stimulation of feed intake, as well as to endogenous enzyme secretion, resulting in better utilization of food nutrients and higher performance – weight gain and food convertion rate (Devegowda, 1996; Camel, 2002, Wenk, 2002).

Table 5. Carcass weight and dressing percentage
Tablica 5 Težina polovica i postotak randmana trupla

Items	Control group Kontrolna skupina	Experimental group (TIMIKO) Pokusna skupina (TIMIKO)	%
Pre-slaughter weight - Težina prije klanja, g	2956 ± 174.1	3103 ± 158.8	105.0
Carcass weight - Težina polovica/trupla, g	1837 ± 103.1	1934 ± 94.4	105.3
Dressing percentage - Postotak randmana	62.1	62.3	96.0

Table 6. Chemical composition of rabbit meat
Tablica 6. Kemijski sastav mesa kunića

Items	Control group Kontrolna skupina	Experimental group (TIMIKO) Pokusna skupina (TIMIKO)	%
Dry matter - Suha tvar, %	25.47 ± 1.21	24.95 ± 0.95	98.0
Crude protein - Sirove bjelančevine, %	21.55 ± 0.28	22.14 ± 0.25*	102.7
Crude fats - Sirove masnoće, %	3.52 ± 1.39	2.57 ± 1.07	73.0
Crude ash - Sirovi pepeo, %	0.82 ± 0.14	0.88 ± 0.18	107.3

* - P<0.05

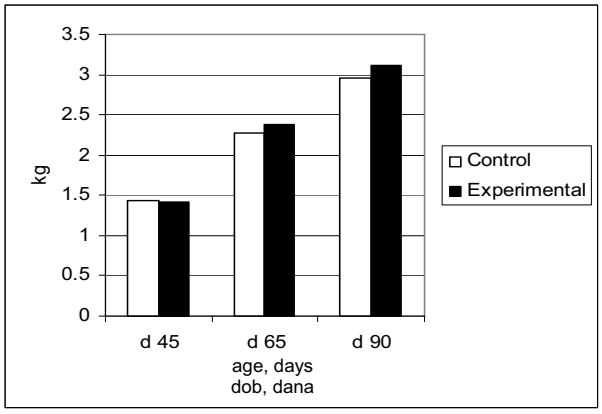

Fig. 1. Live weight
Slika 1. Živa vaga

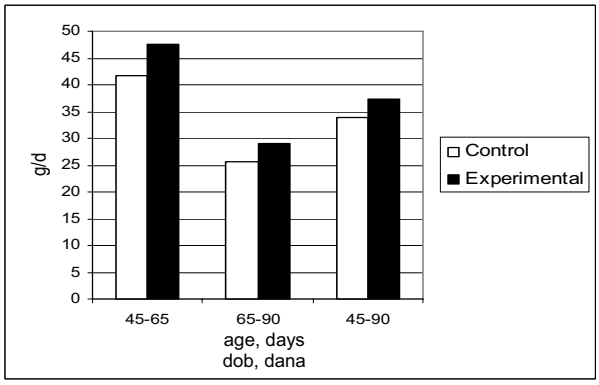

Fig. 2. Average daily gain
Slika 2. Prosječan dnevni prirast

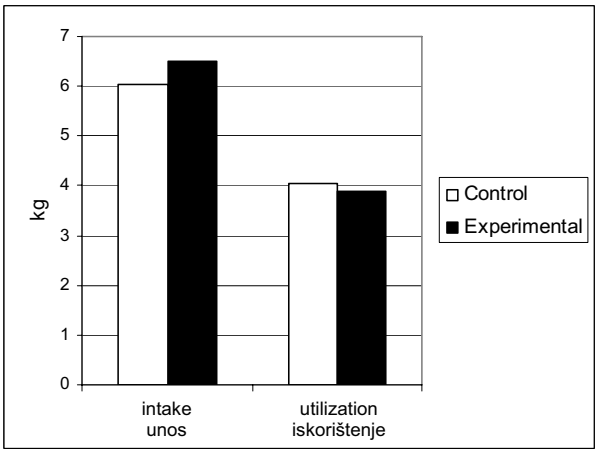

Fig. 3. Feed intake and utilization
Slika 3. Unos i iskorištenost hrane

CONCLUSION

Results obtained in the study of 0.03% aroma TIMIKO addition to the diets of fattening rabbits have shown that TIMIKO supplementation has positive effects on final body weight by 5.0% and on growth rate by 9.7%. TIMIKO addition increased feed intake by 7.5% and improved feed utilization by 4.0%.

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SAŽETAK

Pokus 45d obavljen je radi proučavanja djelovanja dodatka arome u obroke na rast, djelotvornost hrane i značajke tovljenja novozelandskih bijelih kunića. Bile su dvije skupine: jedna bez dodatka i jedna s dodatkom 0,03% arome TIMIKO. Određeni su prirast težine, unos i iskorištenost hrane te značajke polovica.

Kunići hranjeni obrocima s aromom rasli su brže ($P < 0.001$) nego kunići u kontrolnoj skupini (37,3 odnosno 34,0 g). Dodavanje TIMIKO-a povećalo je prosječan dnevni unos hrane za 7,5% (144 prema 134 g) i poboljšalo omjer konverzije hrane za 4.0%. Nisu primijećene razlike u postotku randmana.

Ključne riječi: tov kunića, hranidba, dodavanje arome, rezultati