Acta Agraria Kaposváriensis (1999) Vol 3 No 2, 337-342
Pannon Agrártudományi Egyetem, Állattenyésztési Kar, Kaposvár
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Influence of Salinomycin-Na on business results in pig production

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ABSTRACT

The investigation was conducted on 150 swine divided into three groups. The first group was given a control treatment (without antibiotic), while the second and third groups were given ratios of 30/15 ppm and 50/25 ppm Salinomycin-Na respectively. All groups received rations with 16.5% crude protein and 13.42 MJ/kg ME from live weight 28 kg up to live weight 60 kg. After they reached a weight of 61 kg up to the end of production the ration was balanced at a level of 14.2% crude protein and 13.27 MJ/kg ME. The objective of this investigation was to determine the influence of Salinomycin-Na on farm revenues. Salinomycin-Na applied in higher concentration (50/25 ppm) changed the distribution of commercial classes in comparison to the control group. The number of animals in classes E and U increased and the number of animals in class R decreased. Changes in the group with lower concentration (30/15 ppm) were marginal. The application of Salinomycin-Na did increase farm revenues by 2.89% for lower and 8.90% for higher concentration. This was due to changes in two factors: higher final weight and greater leanness of the carcasses. In addition, marginal increase in the unit price of fodder for experimental treatments and better conversion resulted in an increase in fodder costs of 1.41% for the lower concentration and 3.32% for the higher concentration. The use of Salinomycin-Na in the form of Grosal at a concentration of 50/25 ppm proved economically viable. It is possible to achieve an increase in gross margin after feed costs of 5%. An even lower ratio of Salinomycin-Na (30/15 ppm) increased the gross margin after feed costs, but only by 1.5%.
(Keywords: pig production, economics, Salinomycin-Na, Croatia)

ZUSAMMENFASSUNG

Einfluß von Salinomycin-Na auf die Wirtschaftlichkeit der Mast von kastrierten Jungebern

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Die Forschung umfaßte insgesamt 150 Schweine, die in 3 Gruppen aufgeteilt wurden. Die erste Gruppe war Kontrollgruppe (ohne Antibiotika). Die zweite und die dritte Gruppe bekamen eine Salinomycin-Na-Ration von 30/15 ppm, bzw. 50/25 ppm. Alle Gruppen erhielten von 28-60 kg Lebendgewicht Rohproteinrationen von 16,5% und 13,42% MJ/kg ME. Nachdem ein Gewicht von 61 kg erreicht war, wurden 14,2% und 13,27% MJ/kg ME Rohprotein bis zum Ende der Mast gegeben. Ziel dieser Forschung

war die Bestimmung des Einflußes von Salinomycin-Na auf die Einnahmen der landwirtschaftlichen Betriebe. Die Verwendung von Salinomycin-Na in höherer Konzentration (50/25 ppm) veränderte die Einteilung in die Handelsklassen gegenüber der Kontrollgruppe. Die Anzahl der Tiere in den Klassen E und U erhöhte sich, in der R Klasse verrringerte sie sich. Die Änderungen in der Gruppe mit niedrigerer Konzentration (30/15 ppm) waren unbedeutend. Die Verwendung von Salinomycin-Na in niedriger Konzentration erhöhte die Einnahmen um 2,89%, bei höherer Konzentration um 8,90%. Dies ist 2 Faktoren – einem höheren Endgewicht und damit einem höherem Fleischanteil zu verdanken. Eine unbedeutende Einzelpreiseerhöhung für das Versuchsfutter und bessere Konversion verursachten bei niedriger Konzentration eine Erhöhung der Futterkosten um 1,41%, bei höherer Konzentration eine Erhöhung um 3,32%. Die Anwendung von Salinomycin-Na in Form von Grosal und die Konzentration von 50/25PP ppm erwies sich als ökonomisch berechtigt. Es ist möglich, eine Erhöhung des Deckungsbeitraegs für Futterkosten um 5% zu erreichen. Sogar deine niedrigere Salinomycin-Na-Dosis (30/15 ppm) erhöhte den Deckungsbeitrag für Futterkosten, jedoch nur um 1,5%.
(Schlüsselwörter: Schweinemast, Ökonomie, Salinomycin-Na, Kroatien)

INTRODUCTION

Salinomycin-Na is used as a nutritive antibiotic in swine nutrition. As a supplement it prevents the development of pathogenic gut microflora, reduces the quantity of fodder consumed, protects symbiotic microorganisms and makes their growth and reproduction possible. Furthermore it stimulates digestion, and accelerates the adsorption and distribution of nutrients and energy. The level of stimulating effect attained in its use depends on several factors. Age is recognised as an important factor and applied in younger animals nutrition antibiotic has higher efficiency. *Thaler and Wheaves* (1993) reported a 15% increase in piglet gain for 2.4% better conversion. Moreover, environmental hygiene and the general health condition of animals are also important.

The positive influence of Salinomycin-Na in swine feeding was confirmed by *Scheurmann* (1992) and *Salobir et al*. (1994, 1996). Investigations by *DeWilde* (1991) and *Kralik et al.* (1998) showed improved growth, but also a tendency for lower fat deposition associated with greater leanness of carcasses at concentrations from 15/30 ppm to 60/30 ppm Salinomycin-Na.

The objective of this investigation was to determine the influence of Salinomycin-Na on farm revenues. The market values of swine carcasses were estimated according to the (S)EUROP system (Pravilnik N.N. 79/95).

MATERIALS AND METHODS

The investigation was conducted on 150 swine divided into three groups. The first group was given a control treatment (without antibiotic). The treatment for the second group had a ratio of 30/15 ppm Salinomycin-Na and that for the third group 50/25 ppm Salinomycin-Na. All groups received ration ST-1 (16.5 % crude protein and 13.42 MJ/kg ME) from live weight 28 kg up to live weight 60 kg. From the weight of 61 kg up to the end of production ration ST-2, balanced at a level of 14.2% crude protein and 13.27 MJ/kg ME, was used.

The fattening period lasted 91 days for all groups. On the slaughter line the weights of the warm carcasses, together with back fat thickness with skin in mm, were measured

at the point where *Musculus gluteus medius* entered the back fat at the most (point S). Measurements also included loin muscle depth in mm and the shortest connection of *Musculus gluteus medius* with the dorsal spinal edge (point M).

Estimation of the quantity of muscle tissue was calculated according to the following mathematical expression:

$$y(\%) = 13.4592 + 50.944\frac{S}{M} + 7{,}17767\sqrt{M} + 45.1467\log_{10} S - 20.682\sqrt{S}$$

The carcasses were classified into (S)EUROP classes according to estimated proportion of muscle tissue. After classification into commercial classes the efficiency of Salinomycin-Na in pig production was determined by comparing the results for the experimental groups with those for the control group.

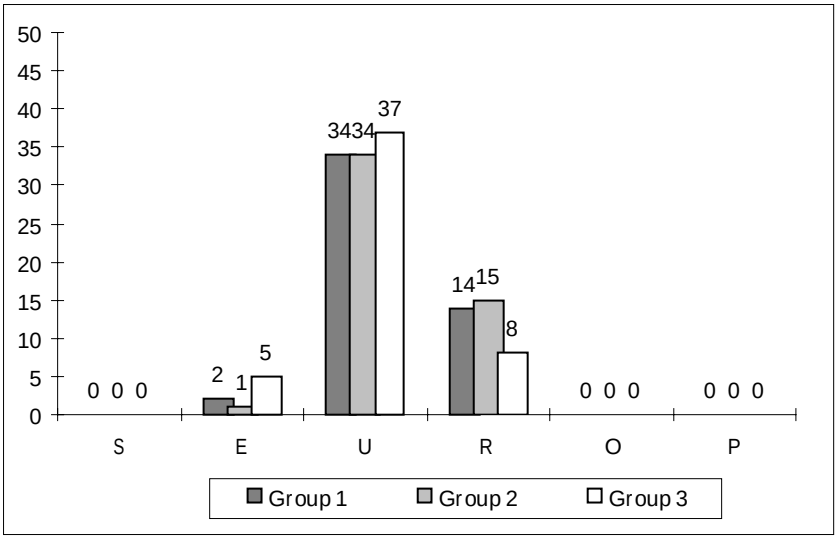
All prices are in Croatian kuna (kn), the current exchange rate being 1 EUR=7.5921 kn (July 7, 1999). Statistical procedures were performed using SPSS for Windows 6.1.

RESULTS AND DISCUSSION

Salinomycin-Na applied in higher concentration (50/25 ppm) changed the distribution of commercial classes in comparison to the control group. The number of animals in classes E and U increased and the number of animals in class R decreased. Changes in the group with lower concentration (30/15 ppm) were marginal: only one animal fewer in class E and one animal more in class R, with the same number of animals in class U (*Figure 1*).

Figure 1

Distribution of commercial classes in the various groups



1. Abbildung: Einteilung in die verschiedenen Handelsklassen

The application of Salinomycin-Na increased farm revenue by 2.77 and 8.56 EUR for each fattened animal in groups two and three respectively. This increase of 2.89% for the

lower and 8.90% for the higher concentration was due to changes in two factors: higher final weight and greater leanness of the carcasses in both experimental groups (*Table 1*).

The equation for multiple regression was

$$R[kn] = -762.709573 + 8.036390\ Fw + 14.611258\ y,$$

R square being 0.99889.

Table 1

Results of ANOVA procedure for selected production results *

	Group 1 (Control)	**Group 2 (30/15 ppm)**	**Group 3 (50/25 ppm)**
Fw–final weight [kg](1)	93.02±4.51 **a**	95.41±5.24 **b**	98.28±6.94 **c**
Cw–carcass weight [kg] (2)	73.52±4.10 **a**	75.67±4.44 **b**	78.06±6.20 **c**
y–quantity of muscle tissue [%] (3)	50.99±2.35 **a**	51,19±2.41 **a**	52.55±2.22 **b**
R–market value of slaughtered animal [EUR](4)	96.18±6.52 **a**	98.96±6.04 **a**	104.74±8.78 **b**

* Average values are always shown with std. deviation. Means with the same letter are not statistically different according to Fisher's protected LSD test (P≤0.05). *(Der Durchschnittswert zeigt immer Standardabweichungen. (Gleichen Buchstaben bedeuten, dass keine Signifikanz vorhanden ist zu dem LSD-Test von Fisher.)*

1. Tabelle: Ergebnisse der ANOVA-Behandlung auf einzelne Produktionsparameter

Mastendgewicht(1), Gewicht Schlachthälfte(2), Menge der Muskulatur(3), Marktwert der Schlachttiere(4)

Taking into consideration the price of Grosal (containing 12% Salinomycin-Na), at 43 kn per kg, increase in the unit price of fodder for the experimental treatments was marginal, from 0.25% for the lowest concentration up to 0.79% for the highest concentration (*Table 2*).

Table 2

Unit prices for fodder in the various groups [**EUR per kg**]

	Group 1 (Control)	**Group 2 (30/15 ppm)**	**Group 3 (50/25 ppm)**
ST 1 ratio (1)	0.30	+0.48%	+0.79%
ST 2 ratio	0.28	+0.25%	+0.42%

2. Tabelle: Futterpreise in den verschiedenen Gruppen (EUR/kg)

Verhältniszahl(1)

The total cost of the fodder consumed for the first and the second phase of fattening and for the whole fattening period is shown in *Table 3*. The moderate increase in the unit price of fodder for both experimental groups, combined with better conversion, resulted in increases in fodder costs of only 1.41 % for group 2 and 3.32 % for group 3.

Table 3

Cost of fodder consumed in the various groups [EUR]*

	Group 1 (Control)	Group 2 (30/15 ppm)	Group 3 (50/25 ppm)
Ration ST 1 (1)	30.07 (100)	30.58 (101.72)	30.23 (98.84)
Ration ST 2	32.26 (100)	32.63 (101.12)	35.08 (107.51)
Total	62.33 (100)	63.21 (101.41)	65.31 (103.32)

***** Control group=100

3. Tabelle: Kosten für verbrauchtes Futter in den verschiedenen Gruppen (EUR)

Verhältniszahl(1)

The use of Salinomycin-Na in the form of Grosal at a concentration of 50/25 ppm proved economically viable. It is possible to achieve an increase in gross margin after feed costs of 5 %. An even lower ratio of Salinomycin-Na (30/15 ppm) increased the gross margin after feed costs, but only by 1.5%.

CONCLUSIONS

Salinomycin-Na applied in higher concentration (50/25 ppm) changed the distribution of commercial classes in comparison to the control group. The number of animals in classes E and U increased and the number of animals in class R decreased. Changes in the group with lower concentration (30/15 ppm) were marginal.

The application of Salinomycin-Na increased farm revenue by 2.89% for the lower and 8.90% for the higher concentration. This was due to changes in two factors: higher final weight and greater leanness of the carcasses. In addition, the increase in the unit price of fodder for the experimental treatments was marginal, from 0.25% for the lowest concentration up to 0.79% for the highest concentration.

The use of Salinomycin-Na in the form of Grosal at a concentration of 50/25 ppm proved economically viable. It is possible to achieve an increase in gross margin after feed costs of 5%. An even lower ratio of Salinomycin-Na (30/15 ppm) increased the gross margin after feed costs, but only by 1.5%.

REFERENCES

Anonymous (1995). Pravilnik o utvrđivanju trgovačkih kategorija i klasa svinjskih trupova i polovica. Narodne Novine 79.

DeWilde, R.O. (1991). Comparison of Virginiamycin and Salinomycin as growth promoters in growing-fattening pigs. Dtsch. Tierärztl. Wschr., 91. 22-24.

Kralik, G., Maltar, Z., Domjanović, V., Kušec, G. (1998). Učinkovitost Grosala u tovu svinja. Krmiva 40. 6. 329-335.

Kušec, G. (1996). Istraživanje prinosa mesa svinja različite genetske osnove. Masters thesis, Faculty of Veterinary Medicine, University of Zagreb.

Scheurmann, S.E. (1992). Untersuchungen der Reduktion N-Ausscheidung und zur Einsparung von Futterprotein durch Salinomycin Na beim wachsenden Schwein. Die Mühle und Mischfuttertecnik 129. 36. 497-499.

Salobir et al. (1994). Utjecaj antibiotika Salinomycin-Na (Grosal) kao dodatka u tovu svinja. Rukopis 1-10, Biotehniška fakulteta Univerze v Ljubljani.

Salobir, K., Salobir, J., Žgur, S., Škerjanec, M., Štruklec, M., Fajdiga, M. (1996). Effect of zinc-bacitracin (Nubatrin) and Salinomycin (Grosal) on the performance, carcass traits and meat characteristics of fattening pigs. Krmiva, 38. 1. 3-10.

Thaler, R.C., Wheaves, E.M. (1993). Dietary management in pigs. Food and Animal Practice. W.B. Sanader Company, London, 278-285.

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