Tylosin Levels in the Tissue of Pig after Medication in Drinking Water

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Tylosin is a macroride antibiotic, exhibiting activity *in vitro* against most gram-positive organisms and certain gram-negative organisms.¹⁾ It has been widely used for domestic animals and fowls as a feed additive in the drinking water or so. In swine, several investigators reported that tylosin was highly effective against swine dysentery in the field.^{2,3,4,5)} However, HUBER stated a large residue of certain antibiotics is harmful for human health.⁶⁾

The present study is undertaken to determine the residual tylosin in the tissues of the pig treated with tylosin tartrate in the drinking water.

Materials and Methods

Ninety-day-old pigs which had been given a feed free from antibiotics for 2 weeks until the start of the experiments were used. A total of 30 pigs was divided into 3 groups. Two groups were medicated with 0.025% (Group A) or 0.05% (Group B) of tylosin tartrate in drinking water for 5 days. The Group C was not medicated. The pigs of each group were sacrificed at 0, 1, 2 and 5 days after treatment. Tissue samples were frozen until being extracted (15 ml of phosphate buffer, pH 7.8, were added to 5 grams of the samples). After the sample was homogenized, the suspension was kept at 4°C for 18 to 24 hours, and then, was centrifuged at 2500 rpm for 10 minutes. Amounts of residual tylosin in supernatant were assayed by the cylinder cup method, using a strain of *SARCINIA LUTEA* (ATCC 9341).

Results and Discussion

Sensitivity of standard tylosin obtained in this experiment ranged from 0.06 to 0.18 ppm with an average of 0.15 ppm. These values of sensitivity coincide closely with the value reported by other investigators.^{7,8)}

After treatment in the drinking water for 5 days, a total amount of tylosin per pig was given 121.6 mg/kg in group A and 243.7 mg/kg in group B on the average. Tylosin residues in the tissue of pigs are shown in Table 1. In group A, tylosin could not be detected in muscle, heart, kidney, liver, stomach, duodenum and marrow at 0 to 5 days after treatment. Only in group B, a small amount of residue of tylosin was found in the bone marrow (No. 12) and duodenum (No. 16).

Tylosin Residues in Tissue of Pigs

Table 1. Residue of tylosin in the tissue of pigs treated with the drinking water for 5 days

Experi- mental	Days after withdrawal	Pig No.	Tylosin levels in tested organ (ppm)									
			<i>M. triceps brachii</i>	<i>M. rectus femoris</i>	<i>M. long- issimus</i>	Heart	Spleen	Liver	Kidney	Stomach	Duodenum	Marrow
A	0	1	0	0	0	0	0	0	0	0	0	0
		2	0	0	0	0	0	0	0	0	0	0
		3	0	0	0	0	0	0	0	0	0	0
	1	4	0	0	0	0	0	0	0	0	0	0
		5	0	0	0	0	0	0	0	0	0	0
		6	0	0	0	0	0	0	0	0	0	0
	2	7	0	0	0	0	0	0	0	0	0	0
		8	0	0	0	0	0	0	0	0	0	0
	5	9	0	0	0	0	0	0	0	0	0	0
		10	0	0	0	0	0	0	0	0	0	0
B	0	11	0	0	0	0	0	0	0	0	0	0
		12	0	0	0	0	0	0	0	0	0	0.6
		13	0	0	0	0	0	0	0	0	0	0
	1	14	0	0	0	0	0	0	0	0	0	0
		15	0	0	0	0	0	0	0	0	0	0
		16	0	0	0	0	0	0	0	0	0.42	0
	2	17	0	0	0	0	0	0	0	0	0	0
		18	0	0	0	0	0	0	0	0	0	0
	5	19	0	0	0	0	0	0	0	0	0	0
		20	0	0	0	0	0	0	0	0	0	0
C	0	21	0	0	0	0	0	0	0	0	0	0
		22	0	0	0	0	0	0	0	0	0	0
		23	0	0	0	0	0	0	0	0	0	0
	1	24	0	0	0	0	0	0	0	0	0	0
		25	0	0	0	0	0	0	0	0	0	0
		26	0	0	0	0	0	0	0	0	0	0
	2	27	0	0	0	0	0	0	0	0	0	0
		28	0	0	0	0	0	0	0	0	0	0
	5	29	0	0	0	0	0	0	0	0	0	0
		30	0	0	0	0	0	0	0	0	0	0

A: Medicated with 0.025% of tylosin

B: Medicated with 0.05% of tylosin

C: Non medicated

NAKAMURA *et al.* reported that when pigs were subjected to single administration with 50 mg/kg of tylosin phosphate orally, the tylosin was distributed in many tissues within 10 to 60 minutes and could not be detected 24 hours after the treatment, but some remained in digestive tissues.⁸⁾ KLINE and WAITT reported that residual tylosin was detected in liver tissue from swine receiving tylosin phosphate at 1000 g/ton of food up to slaughter. This dosage is about 30 mg/kg as daily average. But no residues were detected in tissue when tylosin phosphate was fed at less than 500 g/ton.⁹⁾ Daily value in the high dose of tylosin used in our experiments coincides much closely with the value reported by NAKAMURA *et al.* Residual tylosin in marrow or duodenum after treatment is essentially similar to those of their reports. It is considered that distribution and absorption of tylosin phosphate appeared to be the same as tylosin tartrate.

Undetectable tylosin after withdrawal might indicate that tylosin was not bound to the tissues of the pig, moreover, tylosin treatment was limited to cure swine dysentery for a short period of time, therefore, tylosin residue might be negligible in the tissue of pig.

References

- 1) MCGUIRE, J.M., W.S. BONIECE, C.E. HIGGENS, M.M. HOEHEN, W.M. STARK, J. WESTHEAD, and R.N. WOLFE, Antibiot Chemother 11: 320-327. 1961.
- 2) CURTIS, R.A., Can Vet J 3: 285-288. 1962.
- 3) JORDAN, C.E., WAITT, W.P., and T.M. MEANS, J Anim Sci 19: 1269. 1960.
- 4) GOSSETT, F.O., and J.A. MIYAT, H A Vet Met 59: 169-171. 1964.
- 5) DOORNENBAL, H., Can J Comp Med 29: 179-182. 1965.
- 6) HUBER, W.G., Advances in Veterinary Sci and Comparative Med 15: 101-132. 1971.
- 7) YOSHIDA, M., H. HOSHII, S. YONEZAWA, H. NAKAMURA, and R. YAMAOKA, Japan Poultry Sci 10: 23-28. 1973.
- 8) NAKAMURA, H., H. AZECHI, S. YONEZAWA, S. SATO, and K. NINOMIA, Ann Rep Nat Vet Assay Lab 9: 65-71. 1972.
- 9) KLINE, R. M., and W. P. WAITT, J Ass Offic Anal Chem 54: 112-115. 1971.

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