

Inhibition of monoamine oxidase by furazolidone in the chicken: influence of the alimentary flora

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Furazolidone is widely used in the prevention and treatment of certain bacterial and protozoal diseases which affect poultry. Oral administration of the drug in rat and man has been shown to inhibit monoamine oxidase (MAO) [monoamine: O₂ oxidoreductase (deaminating) EC 1.4.3.4.]. Furazolidone does not inhibit MAO *in vitro*, however, suggesting that a transformation product is responsible for the enzyme inhibition *in vivo* (Stern, Hollifield, Wilk & Buzard, 1967; Pettinger, Soyangco & Oates, 1968).

[British Pharmacopoeia (Veterinary), 1977] inhibited MAO activity by 50% in heart, 39% in brain, 36% in duodenal mucosa and not in liver. The inhibition of the enzyme in heart, brain and duodenal mucosa were all significant at the 2% level.

Furazolidone (200 mg/kg) injected intramuscularly did not affect MAO activity, but administered by crop tube it inhibited the enzyme by 47-72% (Table 1). These observations suggest that the transformation of furazolidone to a MAO inhibitor occurred in the gut. Pretreatment with neomycin to suppress the alimentary flora reduced the effect of furazolidone on MAO activity (Table 1). Thus in the chicken MAO inhibition by furazolidone seems to depend on the presence of the alimentary flora.

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Table 1 Monoamine oxidase activity in homogenates of chicken organs 24 h after administration of furazolidone, and the influence of neomycin thereon

Expt.	Drugs	Monoamine oxidase activity (μmol 4-hydroxyquinoline/g/h)			
		Duodenal mucosa	Liver	Heart	Brain
1	Saline, i.m.	71.00 \pm 3.29 (6)	20.50 \pm 1.46 (6)	2.06 \pm 0.22 (6)	7.97 \pm 0.41 (6)
	Furazolidone (200 mg/kg), i.m.	73.02 \pm 4.61 (6)	20.51 \pm 1.74 (6)	2.02 \pm 0.20 (6)	7.72 \pm 0.52 (6)
2	Acacia mucilage, orally	104.60 \pm 8.77 (6)	27.67 \pm 3.80 (6)	2.94 \pm 0.22 (6)	13.42 \pm 0.41 (6)
	Furazolidone (200 mg/kg), orally	32.83 \pm 6.65 (6)**	8.95 \pm 1.26 (6)**	0.81 \pm 0.09 (6)**	7.11 \pm 0.65 (6)**
3	Neomycin (200 mg/bird, twice daily for 5 days), orally	85.33 \pm 8.17 (6)	22.52 \pm 2.91 (6)	2.71 \pm 0.19 (6)	10.50 \pm 0.59 (6)
	Neomycin (as above) + furazolidone (200 mg/kg), orally with the last dose of neomycin	75.19 \pm 11.54 (6)	15.15 \pm 1.38 (6)**	2.32 \pm 0.14 (6)*	10.05 \pm 0.27 (6)

The values in the table are means \pm s.e. means (No. of observations).

* $P < 0.01$. ** $P < 0.001$.

We have investigated the effect of furazolidone on MAO activity in the chicken. The birds (Thorntons, 8 weeks old) were killed at the end of a feed trial or 24 h after administration of the drug by intramuscular injection or crop tube. Selected organs were homogenized for the estimation of MAO activity by the method of Kramal (1965), in which formation of 4-hydroxy-quinoline from kynuramine is measured spectrofluorometrically.

The addition of furazolidone to the feed at the therapeutic concentration of 0.04% w/w for 10 days

References

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