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Toxicological studies of exposure to furazolidone in chickens and rats

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Furazolidone, N- (5-nitro-2-furfurylidone) -3-amino-2-oxazolidone (FZ) is a nitro-furan that had been used in the treatment of certain bacterial and protozoal infections in man and animals till recently. The present work is concerned with evaluating the toxic properties of FZ from three aspects in chickens and rats; an inductive potential of cytochrome P 450 (P 450) of FZ, metabolism of FZ and the difference of sensitivity to FZ in animals. Chickens are the animals for FZ therapeutic treatments, and rats are commonly used experimental animals. FZ was orally administered to these animals at doses of 62.5 and 125 mg/kg/day for 4 successive days. 62.5 mg/kg/day is a common therapeutic dose for chickens. FZ treatment produced significant increase in total cytochrome P 450, NADPH-cytochrome P 450 reductase (P 450 reductase) activity, and drug metabolism in the liver of chickens, but not in the livers of

rats. The species of P 450 s induced were characterized by using several drug metabolic reactions with reference to those on chicken liver microsomes pretreated with β -naphthoflavone, phenobarbital and acetone. The patterns of induction of drug metabolizing enzyme activities in FZ treated chicken livers were similar to that in phenobarbital induced chickens. The activities of FZ metabolism were increased in liver microsomes from FZ-fed chickens. Moreover, FZ was found to be metabolized by P 450 reductase but not by P 450 in liver microsomes, indicating that the induced P 450 reductase plays an important role in this metabolic reaction. In agreement with these findings, chickens showed different behavior in general toxicities from rats by FZ treatment; chickens have susceptibility to FZ than rats. Thus, chickens may be good experimental animals to study toxicology of FZ.