

# DISTRIBUTION OF SULPHAQUINOXALINE IN TISSUES OF POULTRY

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**Summary:** Distribution of Sulphaquinoxaline, in the blood and tissues of birds has been studied. The clinical importance and possible hazards, of its use in birds is discussed.

**Key words:** sulphaquinoxaline      coccidiostatic action      distribution,  
public health hazard

## INTRODUCTION

Sulphaquinoxaline is widely used for controlling coccidiosis in birds. Information about its pharmacokinetics is however meagre. This study was undertaken to determine the blood levels attained by the drug after an oral dose of 275 mg/kg of body weight was given to leghorn birds. The extent of its distribution in different body tissues and organs is also reported.

## MATERIALS AND METHODS

Six healthy one year old white leghorn hen weighing 2 to 2.2 kg were used. The birds were free from any parasitic infestation and were maintained under a standard feeding schedule.

Each hen was given sulphaquinoxaline orally in a dose of 275 mg/kg body weight. The control blood samples were collected from the wing vein before the administration of the drug. Samples of blood were collected at 2 hr, 6 hr, 12 hr and 24 hr. The hen were sacrificed 48 hr after the administration of the drug. Samples from different organs and tissues were collected. Concentration of the free drug in the blood and organs was determined by Bratton and Marshall (1) colorimetric method.

## RESULTS

A mean peak blood level of 16.1 mg% of the free drug was observed at 12 hr. At 24 hr the mean concentration was 12.7 mg%. The maintenance of high level of the free drug even at 24 hr is distinctly advantageous from clinical stand point. This observation may indicate a 48 hr interval in the repeat drug dosage schedule. The peak concentration of the therapeutically active drug moiety seems to be sufficient for its antibacterial and antiprotozoan activity since generally a sulphonamide concentration ranging between 8 to 10 mg% is considered to be optimally active (4).

The tissues distribution of the drug is shown in Table I. The drug dispersed in fairly high concentrations in the caecum, liver and kidney compared to that of other organs.

The residual sulphonamide concentrations at 48 hrs in the kidney, caecum and liver were 1.68, 1.45 and 1.02 mg% respectively. These concentration are considerably higher than the concentrations in the other tissues. The concentrations in the lungs, brain and yolksac were 0.67, 0.31 and 0.04 mg% respectively, Table I.

TABLE I: Mean concentration in mg% ( $\pm$  S.E.) of free sulphaquinoxaline in tissues of poultry, sacrificed 48 hours, after administration in a dose of 275 mg/kg.

Organ	No. of birds	Mean concentrations	Organ	No. of birds	Mean concentration
Caecum	(4)	1.45 $\pm$ 0.23	Lungs	(4)	0.67 $\pm$ 0.03
Brain	(5)	0.31 $\pm$ 0.03	S.I.	(5)	0.78 $\pm$ 0.14
Yolksac	(5)	0.04 $\pm$ 0.004	Liver	(5)	1.02 $\pm$ 0.17
Spleen	(5)	0.65 $\pm$ 0.04	Kidney	(4)	1.68 $\pm$ 0.10

## DISCUSSION

Sulphonamide concentrations in the blood and tissues of poultry have been studied after a single dose administration of sulphaquinoxaline. The animals were sacrificed 48 hrs after the administration of the drug. Adequate therapeutic concentrations of sulphaquinoxaline were detected in the blood even at 24 hrs, indicating a fairly prolonged therapeutic activity after a single dose.

Relatively high concentrations detected in the caecum at 48 hrs are obviously advantageous, since the caecum is the seat of pathology in certain forms of poultry coccidiosis. The high concentrations in the kidney, also reported by Panda *et al* (2) were expected, because sulphonamides are excreted and concentrated in the kidneys. The concentration of sulphonamides in the kidney is advantageous in urinary tract infections. The main disadvantage of high concentrations in the kidneys is a likelihood of the crystallisation in the kidney substance. This may damage the kidney.

Considerable amounts of sulphonamides were detected in the Yolk Sac. Prolonged retentions of sulphonamides in the tissues of birds and in the Yolk Sac can pose a public health problem. Consumption of table birds and their eggs which have been treated with long acting sulphonamides may produce allergic manifestations in susceptible human beings. Therefore it is suggested that the sale of birds or the eggs of birds treated with sulphaquinoxaline should be prohibited for at least 15 days after the last dose has been administered. Righter *et al* (3) have observed that withdrawal of sulphaquinoxaline for seven days reduces the drug residual concentration in body tissues to one part per million.

Besides the health hazard the subtherapeutic amounts of sulphaquinoxaline may induce bacterial resistance. Development of cross resistance among sulphonamides is a well known possibility.

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