

LXXXVI. STUDIES IN THE SULPHUR METABOLISM OF THE DOG.

VII. THE EFFECT OF FLUOROBENZENE ON SULPHUR METABOLISM.

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IN a former communication of this series [Coombs and Hele, 1926] it was shown that very small differences in chemical constitution very much alter the metabolism of the halogen-benzenes (chloro-, bromo- and iodo-benzenes). These latter bodies all give rise to a mercapturic acid in the urine of dogs after they have been ingested. They are, however, the only compounds which have been definitely proved to cause the synthesis—the substitution of even such a group as methoxyl in the ring causing the metabolism to take a different course. Evidence has been obtained, however, that the *o*- and *m*-dichlorobenzenes and benzene itself probably also give rise to mercapturic acids [Callow and Hele, 1926].

Perhaps the most likely compound which might be expected to form a mercapturic acid is the remaining halogen-benzene, fluorobenzene. This compound fits exactly into the series with the other halogen-benzenes in all its chemical and physical properties, and there would therefore seem no reason why it should not also have a similar effect on sulphur metabolism. To test this point a quantity of fluorobenzene was made and administered to dogs with the results shown in the figures. Benzene itself was also administered with the result shown.

EXPERIMENTAL.

About 150 g. fluorobenzene were prepared by the method of Holleman [1904]. The method gave a very pure product but not in very good yield; the only difficulty that was encountered was the solvent action of the mercury of the mercury seal on the solder of the reaction vessel, but this was easily remedied by the substitution of a seal turned from one piece of copper.

The diet of the dog "Vixen" has been given in a former paper of this series and that of "Pansy" was as follows¹:

		T.N.	T.S.	Calories
		g.	g.	K
"Pansy,"	8.6 kg.:			
Meat	80 g.	2.73	0.181	106
Sugar	70 g.	—	—	286
Margarin	20 g.	—	—	156
Milk	160 cc.	0.83	0.074	115
		3.56	0.255	663

¹ This diet is similar to that given for "Pansy" in Paper V, but differs in sugar content.

It will be seen from the figures that there is a small but distinct rise in the neutral sulphur output following the administration of the fluorobenzene—amounting to about 8 to 11 % of the dose. This rise is small compared to the rise after the other halogen compounds where it is about 47 % [Coombs and Hele, 1926], and is more in accord with that caused by benzene. It must be remembered, however, that there is a great difference in the boiling points—fluorobenzene boiling at 85° whereas chlorobenzene boils at 132°. The disparity in the yield from these two compounds must be attributed, in part at least, to this volatility, because shortly after the fluorobenzene has been ingested it can easily be detected by its odour in the breath of the animal.

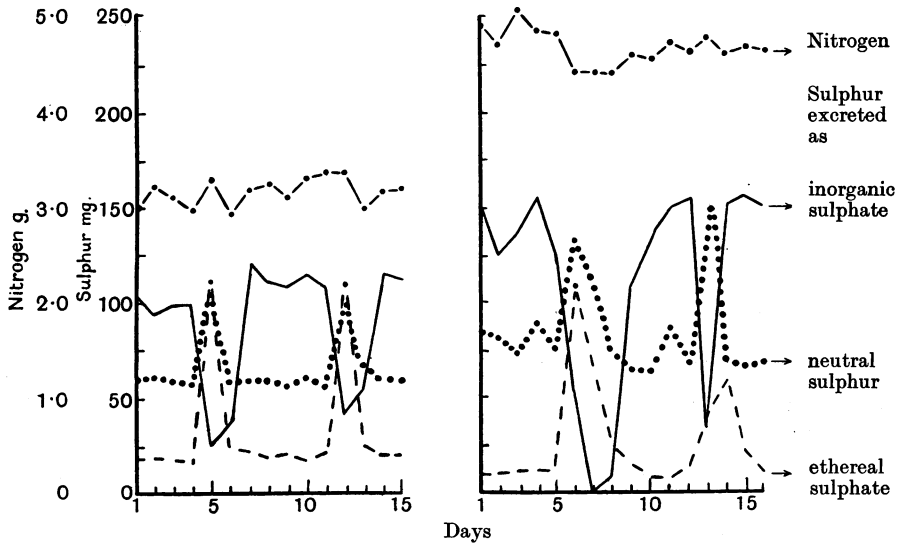


Fig. 1.

Fig. 2.

Fig. 1. "Pansy." Day No. 5. $2 \times \text{m.w./100 g. fluorobenzene}$ } by mouth.
 ,, No. 12. $2 \times \text{m.w./100 g. fluorobenzene}$ }

Fig. 2. "Vixen." Day No. 6. $2 \times \text{m.w./100 g. fluorobenzene}$ } subcutaneously.
 ,, No. 13. $2 \times \text{m.w./100 g. benzene}$ }

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 Coombs and Hele (1926). *Biochem. J.* **20**, 606.
 Holleman (1904). *Rec. Trav. Chim. Pays-Bas*, **23**, 225.