INFLUENCE OF BILE ACIDS ON EROSIONS OF THE CHICK GIZZARD LINING

EXPERIMENTAL results indicating the necessity of an organic dietary factor for the maintenance of a normal gizzard lining in the chick, and the prevention of erosions or lesions of the lining have been given in a number of papers.[1, 2, 3, 4] A series of experiments on the rôle of the bile acids in this deficiency disease may now be reported.

The feeding of whole bile by oral administration or by mixing with diet or as commercial dried bile tablets has been found to prevent the development of the roughened and eroded gizzard lining characteristically found in chicks fed the basal diet without supplement. In other experiments, vacuum concentrated whole beef bile, cholic acid, deoxycholic acid, sodium glycocholate and sodium taurocholate were used as supplements to the basal diet. All these showed a marked protective action against the development of gizzard lesions. In all these experiments vitamin K in the form of an extract of alfalfa was added in a constant amount just sufficient to maintain an approximately normal blood-clotting time. In one case this vitamin K supplement was added at a level about twenty times that required. Typical results may be illustrated by the data given in Table I.

TABLE I

Supplement to basal diet	Number of chicks	Average weight at four weeks, grams	Average blood clotting time, minutes	Average gizzard erosion score[1, 2]
None	10	290	4.9	0.90
Cholic acid, pure, 0.5 per cent. of diet	10	281	4.6	0.05
Vitamin K supplement 20 times adequate level	10	283	2.7	0.96

It is apparent that certain components of bile, when added to the diet, protect against erosion and lesions of the gizzard lining. It seems probable that bile may play a definite rôle in the maintenance of a normal gizzard lining.

The separation of gizzard erosions from the vitamin K deficiency syndrome is given further support in the facts that bile is a very poor source of vitamin K[5] and that large doses of vitamin K can be fed without diminishing the incidence of gizzard erosions.

The identity of the chick gizzard factor with any of the components of bile and the mechanism of the action of these components on the gizzard lining will require further research.

H. J. ALMQUIST

DIVISION OF POULTRY HUSBANDRY,
UNIVERSITY OF CALIFORNIA

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3 H. R. Bird, C. A. Elvehjem and E. B. Hart, *Jour. Biol. Chem.*, 114: p. x, 1936.

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5 Unpublished data of the writer.

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