

INCLUSION OF LOW METABOLISABLE ENERGY WHEAT IN BROILER DIETS
AND THE INCIDENCE OF THE FATTY LIVER AND KIDNEY SYNDROME

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The fatty liver and kidney syndrome (FLKS) is a biotin-responsive metabolic disease of chickens. It occurs in rapidly growing chicks and is often associated with the feeding of wheat-based diets. The low availability of biotin in wheat (Frigg 1976) is believed to be the major contributing factor but other dietary factors are known to be involved. Whitehead and Blair (1974) and Whitehead et al. (1976) have been able to show that increasing the energy: protein (EP) ratio and decreasing either the fat and/or protein content of a ration will increase the incidence of FLKS but reduce biotin deficiency symptoms. The occurrence of wheat with lower than normal metabolisable energy (ME) content (<13 MJ/kg DM) suggests that diets with the same ingredient composition could vary in EP ratio and influence the incidence of FLKS. The results of a trial that examined this possibility are presented in the table.

Performance of 5-week-old chickens fed diets containing wheat differing in ME content. The diets contained 800 g wheat/kg and 133 g sodium caseinate/kg.

	Biotin ($\mu\text{g}/\text{kg}$) diet	High ME wheat diet*	Low ME wheat diet †	SEM
Body weight (g)	0 75	524 937	612 1061	34.3
Liver biotin ($\mu\text{g}/\text{g}$ liver)	0 75	0.66 1.40	0.70 1.63	0.13
BDS [§]	0 75	4.43 0	6.01 0	-
FLKS deaths	0 75	13 0	4 1	-

* Contained 13.9 MJ/kg DM, 207 g/kg CP and 93 μg biotin/kg.

† Contained 11.41 MJ/kg DM, 261 g/kg CP and 102 μg biotin/kg.

§ Biotin-deficiency score (BDS) assessed on a scale from 0 (no lesions) to 8 (very severe lesions).

The study demonstrates that substituting a low-ME wheat for a wheat of higher ME significantly ($P < 0.05$) changes the birds' growth rate, the development of biotin deficiency symptoms and the incidence of FLKS, without altering liver biotin concentration. The results are in accord with those of Whitehead and his colleagues and demonstrate that the chicken's response to biotin is mediated by the EP ratio and protein content of the diet. However, the significance of the present study is that the effects were achieved using diets of identical ingredient composition and may explain the differences noted by some authors in the development of biotin deficiency symptoms and the incidence of FLKS in chicks fed wheat-based diets.

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