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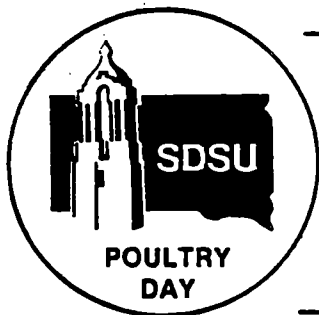
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## FATTY LIVER DISEASE AND DIFFERENT GRAINS<sup>1</sup>

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The definite cause of fatty liver hemorrhagic syndrome (FLHS) is still not certain. However, after several studies at this center we can say that the etiology is in part related to nutrition and metabolism as certain dietary ingredients have been shown to have some protective action against the disease (see A.S. Series 76-1, 77-27, 78-5, 79-24, 80-4, 81-5 and 83-13).

The present experiment was conducted to study the effect of distiller's dried grain (DDG), oats and a mixture of both in layer diets on FLHS. FLHS was experimentally created by force feeding at 120% of the normal intake.

Three hundred sixty Shaver 288 birds at six months of age were used in this experiment. Four diets were used. Diet one was a regular corn-soy type of ration, diet two contained 20% DDG as one of the ingredients, diet three contained a mixture of oats and DDG and diet four had only oats as the major grain. Feed consumption, egg production and other parameters were recorded and analyzed for 12, 28-day periods and the results are shown in Table 1. At the end of the first phase one-sixth of the birds from each diet were force-fed at 120% of their normal intake for three weeks; whereas the rest of the birds were fed ad libitum. Following the 3 weeks all the birds were sacrificed by cervical dislocation. The livers were scored for hemorrhage, weighed and analyzed for liver fat content and the data are shown in Table 2.

During phase one, the hens on diets three and four consumed significantly less feed than those on diets one and two. Following phase two of the experiment, livers from hens on the diets containing the DDG and oats mixture or oats alone showed significantly less liver hemorrhage than the livers from hens on diets one and two. Hens on diet two containing DDG consumed significantly more feed but body weight gain was significantly less than for the other groups. Force feeding again significantly increased liver lipid content, hemorrhage and body weight gain.

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Table 1. Effects of Feed on Production Parameters in Phase One

Diets	Hen-day produc-	Hen-day feed	Kg of feed/ doz eggs	Avg egg wt	Avg body wt	Avg Haugh Unit	Hen-day produc-	G of egg/gm feed
	tion	consump-					tion	
	%	gm		gm	kg		gm	
1 Corn soy	74.0	127	2.11	62.7	1.69	79	46.1	0.37
2 DDG	74.8	132	2.16	62.3	1.68	82	46.3	0.36
3 Oats + DDG	71.5	118*	2.05	62.7	1.70	80	44.4	0.38
4 Oats	71.6	116**	1.98	62.0	1.69	79	44.1	0.38

\* Significant at (P<0.05).

\*\* Significant at (P<0.01).

Table 2. Effects of Feed on Liver Parameters

Diet	Liver wt	Liver score	Total liver lipid	Liver lipid wet basis	Liver as part of body	Body wt change	Hen-day produc- <sup>1</sup> tion	Hen-day feed consumption
	gm		gm	%	%	%	%	gm
1 Corn-soy	37.50	1.92 <sup>a</sup>	3.06	7.68	1.83	111 <sup>a</sup>	34.9	129 <sup>a</sup>
2 DDG	46.91	1.83 <sup>a</sup>	4.02	7.07	2.42	107 <sup>b</sup>	40.5	152 <sup>b</sup>
3 Oats + DDG	43.16	1.33 <sup>b</sup>	6.33	10.04	2.14	111 <sup>a,b</sup>	34.1	137 <sup>a</sup>
4 Oats	36.58	1.00 <sup>b</sup>	1.82	4.82	1.87	115 <sup>a</sup>	35.3	136 <sup>a</sup>
Force-feeding	45.42	1.92 <sup>a</sup>	6.34	11.57 <sup>a</sup>	2.05	120 <sup>a</sup>	32.5	165 <sup>a</sup>
Ad libitum	36.67	1.12 <sup>b</sup>	1.27	3.2 <sup>b</sup>	2.08	102 <sup>b</sup>	39.9	112 <sup>b</sup>

<sup>1</sup> Three weeks during the 13th week of egg production and force-feeding.

a,b Means with different subscripts are significantly different (P<0.05).