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1980

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Recommended Citation

Rakshit, C. C. and Carlson, C. W., "Effect of Distillers' Grains And Oats On Fatty Liver Hemorrhagic Syndrome" (1980). *South Dakota Poultry Field Day Proceedings and Research Reports, 1980*. Paper 5.
http://openprairie.sdstate.edu/sd_poultry_1980/5

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Effect Of Distillers' Grains And Oats On Fatty Liver Hemorrhagic Syndrome

C. C. Rakshit And C. W. Carlson¹

DEPT. OF ANIMAL SCIENCE REPORT

POULTRY 80-4

Fatty liver hemorrhagic syndrome (FLHS) can be a major cause for economic loss due to excessive mortality. Egg production may or may not be affected by this disease. The etiology of this disease is still uncertain, although several nutritional factors are supposed to be associated with it. Several nutritional factors and different feed ingredients have been tried in experiments at this research center with various results (A.S. Series 75-28, 76-1, 77-27, 78-5 and 79-24).

Two studies were recently conducted to determine if distillers' dried grains 30% and distillers' solubles 70% (commercially known as SOLULAC) and oats have any protective effect on FLHS. In the first study, the diets were fed ad libitum and in the second study the same diets were force-fed for 3 weeks at the rate of 120% of their normal intake to experimentally produce FLHS.

In Experiment one 46-week-old SCWL laying hens were fed three different diets (20 on each diet) for seven periods of 28 days each. Diet 1 contained yellow corn and soybean meal as the chief energy protein source. Diet 2 contained the addition of 10% Solulac and in diet 3 corn was replaced by oats. In the second experiment, 50% of the birds from each diet were force-fed and the rest were fed ad libitum. At the end of the experiment, all birds were sacrificed by cervical dislocation. The livers were removed and weighed and analyzed for lipid contents. The production and liver parameters from both experiments are shown in Tables 1 to 3.

There was no significant difference in the production parameters for the three diets in both experiments. The hens on Diet 2 with Solulac showed a slight reduction in liver lipid percent (wet basis) and total liver lipid, although not statistically significant. Diet 3 with oats showed a marked drop in liver lipid percent (wet basis) and total liver lipid, both significant at the $P < 0.01$ level. Force-feeding increased all the liver parameters, but egg production was decreased by force-feeding.

These results indicate that the dried distillers' grain and solubles product may contain a factor which aids in fat metabolism and which could be used to minimize losses from FLHS. To what extent the by-product of local alcohol production plants could be used for this purpose is not known. For poultry feed, drying of the by-product would be essential.

Replacing corn with oats is still the only recommendation for preventing FLHS. This would be impractical with automatic feeding systems. Oats could be used only up to 25% of the total ration because of handling problems.

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Table 1. Effect of dried distillers' grains with solubles and oats on production parameters -- Experiment One

Diet	Hen-day produc- tion %	Haugh unit	Egg weight g	Feed consump- tion g/day
1. Corn-soy ^a	80.6	82	66.0	124.5
2. Solulac (10%)	77.6	83	65.3	129.9
3. Oats ^b	72.4	79*	67.2	127.1

^a A 16% protein corn-soybean meal layer diet fed ad libitum for seven 28-day periods.

^b Oats replaced corn in the diet.

* Significant at the P<0.05 level.

Table 2. Effect of dried distillers' grains with solubles and oats on production parameters -- Experiment Two

Diet	Hen-day produc- tion ^a %	Egg weight g	Hen-day feed consump- tion g
1. Corn-soy	50.3	66.0	124.6
2. Solulac (10%)	59.5	65.0	129.0
3. Oats	68.8*	68.3	145.0*
<u>Ad libitum</u>	66.5	66.2	104.0
Force-fed	52.6*	66.8	161.8**

^a Three weeks production.

* Significant at the P<0.05 level from the corresponding control.

** Significant at the P<0.01 level from the corresponding control.

Table 3. Effect of dried distillers' grains with solubles and oats on liver parameters -- Experiment Two

Diet	Liver score ^a	Liver lipid (wet basis) %	Total liver lipid g	Liver weight g	Body weight kg	Liver as part of body weight %
1. Corn-soy	1.7	22.6	13.6	54.0	2.1	2.6
2. Solulac	1.7	18.3	10.5	51.9	2.0	2.6
3. Oats	1.1*	6.4**	2.9**	40.7*	1.9	2.2
<u>Ad libitum</u>	1.2	10.7	4.8	41.5	1.9	2.2
Force-fed	1.8**	20.8**	13.2**	56.2**	2.1**	2.7*

^a Based on a visual evaluation of the liver with score 1 (dark, no hemorrhage) to 4 (yellow, with many hemorrhages).

* Significant at the P<0.05 level from corresponding control hens.

** Significant at the P<0.01 level from corresponding control hens.