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Research Note

Effects of fat type and an emulsifier on broiler performance

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INTRODUCTION

The use of supplemental fats and oils in broiler chicken diets as dietary energy-yielding ingredients is a wide-spread practice in the feed industry. Dietary fats vary in composition and in their contribution of energy (Wiseman, 1984). A number of reports have demonstrated that the performance of birds fed different fat sources differ significantly (Danicke et al., 1997; Newman et al., 2002; Scaife et al., 1994).

The main factor that affects the metabolizable energy value of oils and fats is their digestibility. It has been shown that fats with a high content of saturated fatty acids are less digestible than those with a high content of unsaturated fatty acids (Atteh and Leeson, 1985; Wiseman and Salvador, 1991). The age of bird is another important factor affecting the ability to digest fats. The production of lipase is limiting in young broilers, but the digestion of fat improves with age (Wiseman and Salvador, 1989). Fat digestion is enhanced by emulsification with bile salts secreted into the lumen of the small intestine from the gall bladder. Lipases act as an oil-water interface and this explains why emulsification is required for fat digestion. Therefore exogenous emulsifiers may enhance fat utilization by young chicks. The objective of the present study was to determine the effects of an exogenous emulsifier and fat type on the performance of broilers.

MATERIALS AND METHODS

Experimental design and diets

The experiment conducted as a 2 x 2 factorial arrangement of treatments. Two basal diets were formulated with two fat sources, namely soybean oil and tallow, at an inclusion level of 40g/kg in starter diets and 60 g/kg in finisher diets, without or with an emulsifier (Lysoforte, Kemin Pte Ltd, Singapore). The diets were formulated to meet commercial specifications and the AME was maintained at 12.2 MJ/kg in the basal diets. Emulsifier agent was included at a level of 500g/tonne as recommended by the manufacturer. Emulsifiers were blended with the fat sources before incorporation into the diets.

Birds and conduct of the trial

Day-old male broiler (Ross 308) chicks were randomly assigned to 24 replicate cages in an environmentally controlled room. There were six replicate cages per treatment and each replicate cage housed 8 birds. Diets were offered *ad libitum* from d 1 to 35. Water was available at all times.

Measurements

Body weights and feed intake recorded at weekly intervals. Mortality recorded daily. Feed/gain adjusted for mortality and calculated by dividing total feed intake by weight gain of live birds plus dead birds. At the end of the experiment, one bird was selected per cage and used to determination of carcass characteristics.

RESULTS AND DISCUSSION

The growth performance of broilers during the starter and overall experimental period are presented in Tables 1 and 2. Weight gain was greater ($P>0.001$) for birds fed the soya oil diet compared with those fed tallow diet during the starter period (d 1- 21) as well the whole trial period (d 1-35). The supplementation of the emulsifier had no effect ($P>0.05$) on the weight gain of broilers, but improved ($P<0.05$) the feed per gain..

Table 1. Effects of fat type with and without emulsifier on the performance of male broilers (1 - 21 d post hatch)¹

Treatment	Weight gain (g/bird)	Feed intake (g/bird)	Feed per gain (g/g)
Tallow	966	1430	1.49
Tallow + emulsifier	963	1361	1.42
Soy oil	1012	1387	1.38
Soy oil + emulsifier	1031	1396	1.36
SEM	9.25	10.1	0.01
Main effects			
Fat type			
Tallow	965	1396	1.46
Soya	1022	1392	1.37
Emulsifier			
with	997	1379	1.39
without	989	1409	1.44
Probability, ≤			
Fat type	0.01	0.84	0.01
Emulsifier	0.61	0.13	0.01
Fat type x Emulsifier	0.48	0.05	0.16

¹ Each value represents the mean of six replicates (8 birds/ replicate).

Table 2. Effect of fats type with and without emulsifier on the performance of male broilers (1- 35 d post hatch)¹

Treatment ²	Weight gain (g/bird)	Feed intake (g/bird)	Feed per gain (g/g)
Tallow	2396	3663	1.61
Tallow + emulsifier	2434	3503	1.53
Soy oil	2448	3455	1.53
Soy oil + emulsifier	2432	3546	1.49
SEM ³	15.1	39.9	0.03
Main effects			
Fat type			
Tallow	2415	3583	1.57
Soya	2440	3501	1.51
Emulsifier			
with	2433	3525	1.51
without	2422	3559	1.57
Probability, ≤			
Fat type	0.01	0.72	0.86
Emulsifier	0.96	0.06	0.03
Fat type x Emulsifier	0.73	0.11	0.94

¹ Each value represents the mean of six replicates (8 birds/ replicate).

² Treatment A = tallow without emulsifier; B = tallow with emulsifier; C =soya oil without emulsifier; D= soya oil with emulsifier

³ Pooled standard error of mean.

No significant differences ($P>0.05$) were noted between treatments for any of the carcass parameters measured, including carcass recovery, breast meat yield and abdominal fat weights (data not shown).

In conclusion, the present data showed that the addition of an exogenous emulsifier to broiler diets containing 4% tallow or soy oil significantly improved feed efficiency, without having any adverse effects of carcass parameters.

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