Use of Canola Meal in Rations for Turkey Broilers

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Recommendations indicating that as much as 20% of canola meal may be used in rations for starting and growing turkeys without affecting growth rate or feed conversion (Robblee et al. 1981) were based on limited data from experiments in which the meals used were specially produced from seed of single cultivars, either Tower or Candle. Since commercial meals are usually produced using blends of seed from different cultivars, it seemed desirable that the recommended usage level be re-assessed using present day commercial meals. The experiment reported herein was designed to re-examine recommended usage levels of canola meal in rations for broiler turkeys using samples of commercial canola meal obtained from several processing plants.

MATERIALS AND METHODS

Quantities of commercial canola meals were obtained from each of four different processing plants and quantities of soybean meal were obtained from two different sources. The composition of the meals are given in Table 1. The four canola meals and two soybean meals were then used in rations for broiler turkeys.

The canola meals were added to prestarter (0-4 wk), starter (4-7 wk), growing (7-10 wk) and finishing (10-13 wk) diets at levels of 10 and 20%. During each period the diets fed were formulated to be isocaloric and isonitrogenous. The metabolizable energy value used for canola meal was 1900 kcal per kilogram. The calculated composition of the diets fed during each of the growing periods were as follows: prestarter 2652 kcal/kg ME, 28.1% protein; starter 2664 kcal/kg ME, 25.1% protein; grower 2733 kcal/kg ME, 22.1% protein and finisher 2852 kcal/kg ME and 17.6% protein.

The formulae of the basal diets used during each period are presented in Table 2. Additions of canola meals were made at the expense of wheat, soybean meal, and biofos with fat added to keep the diets isocaloric. The diets using the two samples of soybean meal served as positive controls in the experiments.

In the experiment triplicate groups of twenty-six broiler-type poults (13 male and 13 female) were fed each ration. The poults were brooded and reared in floor pens in a heated, force-ventilated building. Auxiliary heat was provided by thermostatically controlled infra-red heat lamps. Straw was used as litter. Feed and water were supplied ad libitum in feeders and waterers of suitable size. Fourteen hours of artificial light were provided per day.

Body weights were recorded at 4 and 13 weeks of age. Records of feed consumption and mortality were kept throughout the study. Incidence of perosis and other hock disorders was recorded throughout and at the conclusion of the study.

At the end of the feeding period two females from each replicate were subjected to a consumer taste test. In this test two birds selected at random from the above samplings were supplied to a consumer for evaluation of the eating quality of the birds.

The data for body weight, feed conversion and mortality were analyzed statistically by analysis of variance using the Newman-Keuls procedure for assessing differences between means (Steel and Torrie, 1960).

RESULTS AND DISCUSSION

Summaries on body weight and feed-gain ratios to four weeks of age and on body weight, feed-gain ratios and mortality to thirteen weeks of age are presented in Tables 3 and 4, respectively. At 4 weeks of age (Table 3) there were no significant differences in the body weights of the poults fed the rations containing 10 or 20% of the four different canola meals (rations 2 to 9) and those fed the soybean meal-containing control rations (rations 1 and 10). On the other hand, two of the rations containing 20% of canola meal (rations 5 and 7) showed significantly lower feed-gain ratios. In spite of the fact that every precaution was taken to avoid feed wastage, it is possible that the feed-gain ratios of the poults in the other pens could have been higher because of feed wastage. There is a tendency for poultrymen to keep feed troughs full (which is conducive to feed wastage) during the early life of poults to avoid starve-outs. The fact that feed-gain ratios at thirteen weeks of age (Table 4) were unaffected by ration treatment would tend to support the above conjecture. Analysis of the body weight data collected at thirteen weeks of age (Table 4) suggests that inclusion of 10% of meal D in the ration resulted in inferior growth of male birds. However, since inclusion of 20% of this meal in the ration had no adverse effect on growth, one can attach no practical significance to the results at the 10% level of inclusion. Mortality in all groups was low and not significantly different at $P<0.05$. Incidence of perosis or hock disorder throughout all treatments was very low, averaging 1.03%, and there was no indication that ration treatment was involved.

Consumer evaluation of the birds at 13 weeks of age indicated that there were no off-flavours or undesirable odors among the birds from the various ration treatments. The reports indicated the birds were tender and juicy and of excellent eating quality.

SUMMARY

The results of this study suggested that as much as 20% of canola meal may be included in rations for broiler turkeys. Birds fed such rations grow as rapidly, convert feed as efficiently and produce carcasses of eating quality equal to those of birds fed rations based on soybean meal.

ACKNOWLEDGEMENTS

This work was supported in part by a grant from the Canola Council of Canada.

REFERENCES

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Table 1. Composition of canola and soybean meals

	Canola meals (CM)				Soybean meals (SBM)	
	A	B	C	D	1	2
Moisture, %	8.0	9.2	8.5	8.8	10.3	9.9
Crude fibre, %	10.9	11.4	11.1	11.5	3.0	2.83
Ether extract, %	4.0	3.2	1.9	2.8	1.8	2.7
Protein, %	38.3	36.3	36.2	35.5	46.2	46.3
Amino acids (g/16g N)						
Alanine	4.60	4.84	4.70	4.74	4.53	4.46
Arginine	5.98	5.76	5.73	5.79	7.12	7.01
Aspartic acid	8.24	8.28	8.23	8.27	12.34	12.23
Cystine	0.91	0.94	0.90	0.90	0.82	0.84
Glutamic acid	18.90	18.79	18.66	18.40	19.59	19.42
Glycine	5.20	5.42	5.44	5.34	4.51	4.40
Histidine	2.76	2.58	2.56	2.61	2.59	2.58
Isoleucine	2.71	2.82	2.66	2.79	2.99	3.08
Leucine	6.96	6.77	6.70	6.84	7.31	7.44
Lysine	5.72	5.65	5.64	5.67	6.29	6.23
Methionine	1.87	2.08	2.00	1.98	1.29	1.29
Phenylalanine	3.85	3.70	3.70	3.75	4.60	4.60
Proline	5.66	6.85	6.17	6.17	5.21	5.12
Serine	4.64	4.78	4.75	4.85	5.71	5.67
Threonine	4.49	4.42	4.44	4.43	3.87	3.89
Tryplophane	1.25	1.32	0.97	1.25	0.96	1.03
Tyrosine	2.69	2.82	2.73	2.82	3.43	3.47
Valine	3.43	3.55	3.17	3.52	2.90	2.89

Table 2. Composition of basal diets

	Prestarter 0-4wk	Starter 4-7wk	Grower 7-10wk	Finisher 10-13 wk
Ground wheat	45.3	55.4	65.0	77.1
Stabilized tallow	1	-	-	1
Soybean meal 1	46	37	28.0	15
Biofos (18% Ca-21%P)	2	2	1.5	1.5
DL Methionine	0.1	0.1	0.1	0.05
Selenium premix[1]	0.1	0.1	-	-
NF 180	0.1	-	-	-
Amprol (25% amprolium)	0.05	0.05	0.05	-
Constant ingredients[2]	5.35	5.35	5.35	5.35

[1]Supplied in wheat shorts 0.1 mg of selenium per kg of diet.

[2]Supplied the following levels per kg of diet: dehydrated alfalfa 10g; ground limestone 20g; iodized salt 3.5g; manganese sulfate (27.3% Mn) 400mg; zinc oxide (77% Zn) 100mg; wheat shorts 19; vitamin A 12000 IU; vitamin D_3 1800 ICU; vitamin E 10 IU; menadione sodium bisulfate 1mg; riboflavin 5mg; calcium pantothenate 10mg; niacin 20mg; choline chloride 100mg; folic acid 1mg; biotin 0.2mg; vitamin B_{12} 10µg.

Table 3. Mean weights and feed conversion at four weeks of age[1]

Ration No.	Treatment	Body weight, g		Feed/ gain
		Males	Females	
1	Basal (SBM 1)	727	624	1.63^{ab}
2	10% CM A	737	647	1.58^{ab}
3	20% CM A	717	609	1.60^{ab}
4	10% CM B	713	623	1.60^{ab}
5	20% CM B	735	622	1.55^{b}
6	10% CM C	727	629	1.58^{ab}
7	20% CM C	724	641	1.54^{b}
8	10% CM D	706	632	1.56^{ab}
9	20% CM D	719	601	1.56^{ab}
10	Basal (SBM 2)	688	657	1.64^{a}
	Standard error	11.7	11.6	0.02

[1]Means bearing the same or no superscript are not significantly different ($P<0.05$).

Table 4. Mean body weights, feed conversion and mortality at thirteen weeks of age

Ration No.	Treatment	Body weight g		Feed/ gain	Mortality %
		Males	Females		
1	Basal (SBM 1)	5607[a]	4045	2.82	2.5
2	10% CM A	5562[a]	4065	2.77	3.8
3	20% CM A	5373[ab]	3946	2.70	1.3
4	10% CM B	5478[ab]	3998	2.71	3.8
5	20% CM B	5436[ab]	3960	2.68	2.6
6	10% CM C	5598[a]	4003	2.76	3.8
7	20% CM C	5434[ab]	4114	2.74	2.5
8	10% CM D	5219[b]	4007	2.72	3.8
9	20% CM D	5440[ab]	3908	2.73	2.6
10	Basal (SBM 2)	5505[ab]	4079	2.84	2.6
	Standard error	70.5	49.0	.05	2

[1]Means bearing the same or no superscript are not significantly different ($P<0.05$).