Summary of Recent Canadian Research on the Use of Canola Meal in Rations for Poultry and Swine

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POULTRY

Usage levels for canola meal

Current Canadian recommendations on the use of low glucosinolate-type rapeseed meal (canola meal) in relations for poultry are as follows :

- starting and growing chickens and turkeys – 20 %
- laying and breeding white-egg layers – 10 %
- laying and breeding brown-egg layers – 3 %
- breeding turkeys – 15 %.

These usage levels have been based on studies involving wheat and/or corn based rations. Recently, Robblee *et al.*, at the University of Alberta, reported on experiments with broilers and layers in which high levels of sorghum grain were used in rations containing 20 % or 10 %, respectively, of canola meal (CM). No adverse effects on productive traits were observed. Studies done on sorghum-CM rations by Alvila in Mexico with broilers and by Arscott *et al.* in the U.S.A. with white-egg leayers have confirmed the appropriateness of the above mentioned levels of CM in rations for broilers and layers.

Metabolizable energy

Current recommended metabolizable energy values for CM are 1900 kcal/kg for starting and growing birds and 2000 kcal/kg for laying birds. Salmon at CDA, Swift Current, has recently reported average true metabolizable energy values (TME), using adult roosters, for three and eight samples of CM of 2490 and 2400 kcal/kg, respectively, based on dry-matter content. Blair *et al.*, at the University of Saskatchewan, obtained an average TME value using broilers for three samples of CM of 2223 kcal/kg, based on dry-matter content. If one converts these values to ME "as fed", one obtains verification for the recommended ME values for CM.

Meal from new cultivars

Blair *et al.* at the University of Saskatchewan have reported that meals produced from the new cultivars Triazine-resistant and Westar are comparable to commercial CM from the point of view of composition or growth promotion of broiler chickens.

Nutrient availability

In studies at the University of Guelph, Summers and Leeson have reported no difference in the incidence of leg disorders between broilers fed rations based on soybean meal (SBM) or on rations containing CM. In studies with layers, the Guelph workers have reported that rations containing 15 % CM appear to be equally limiting in leucine, phenylalanine and lysine, whereas rations based on SBM were found limiting in methionine and leucine.

On the subject of mineral availability, Guenter and Ward at the University of Manitoba have confirmed the work of Nwokolo and Bragg, at the University of British Columbia, that showed that mineral availability in CM is lower than in SBM, probably due to the higher levels of fibre and/or phytate in CM vs. SBM. The Manitoba workers found that supplementation of CM-containing broiler diets with 20 or 40 ppm of zinc resulted in a reduction of the number of cripples. However, the authors state that since zinc supplementation in broiler diets is common practice in the feed industry, the inclusion of up to 20 % of CM in broiler diets should not cause any problem. Summers, at the University of Guelph, has confirmed that SBM is a poorer source of available phosphorus than CM.

Haemorrhagic liver syndrome

Very little work is going on in Canada on this problem as most researchers feel satisfied that hae-

morrhagic liver syndrome is no longer a problem now that the switch has been made from high glucosinolate-type rapeseed meal to low glucosinolate-type meal.

Fishy taint in eggs

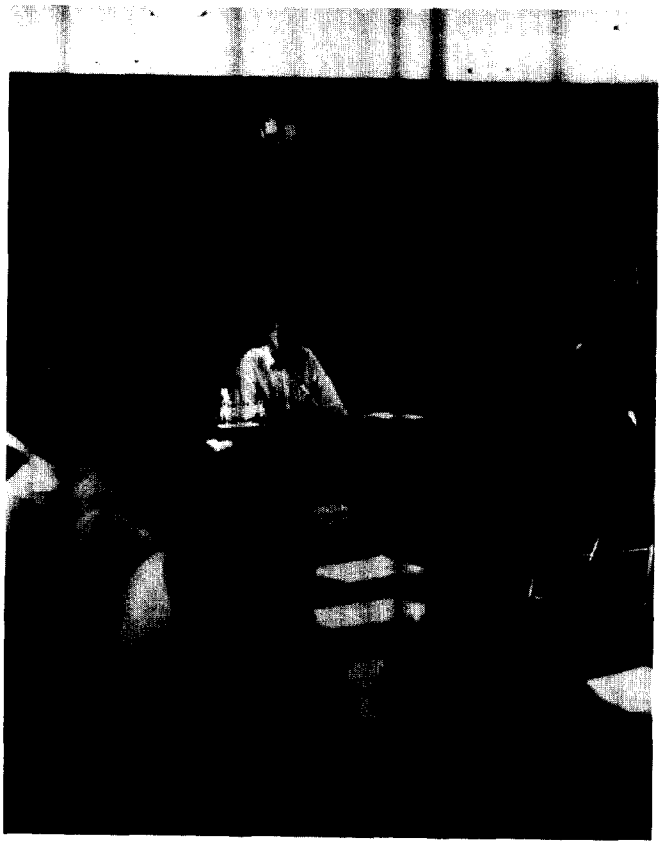
This problem has been extensively studied in England and Canada. Recent work at the University of Alberta has shown that brown-egg layers that have been caecectomized are incapable of laying eggs with a fishy odor when fed rations containing 10 % CM or 0.5 % choline chloride. This demonstrates the important role that the caeca play in the production of trimethylamine, the factor responsible for the fishy odor in eggs of brown-egg layers (some strain-crosses of white-egg layers may also be affected) fed rations containing CM. Goh *et al.*, at the University of Alberta, have shown that in rations containing a constant amount of sinapine, oxazolidinethione in the diet depressed TMA-oxidase activity more than progoitrin in the diet.

On the subject of the development of strain-crosses of poultry that are capable of oxidizing TMA to TMA-oxide, the current feeling in Canada is that it is unrealistic to expect poultry breeders to produce strain-crosses of chickens that do not possess the genetic defect involved in the RSM-CM fishy egg problem. It would, therefore, appear that until such time as the sinapine level in CM is reduced by processing or by plant breeding to less than one-third of current levels, one should use not more than 3 % CM in the ration of layers that possess the potential of laying fishy eggs when fed rations containing CM.

Salmon *et al.*, at CDA, Swift Current, reported that the inclusion of 20 % CM in rations for broilers produced no fishy odor or fishy taste in the meat. However, inclusion of 5 % herring meal produced off-flavors.

Full-fat canola seed

There appears to be considerable interest in using canola seed as a source of protein and energy, particularly in countries where availability and cost of fat limits the use of same in poultry rations. Robblee, at the University of Alberta, has shown that 10 % of raw flaked canola seed may be used without detrimental effects in diets of broilers and layers as a source of protein and energy. Salmon at CDA, Swift Current, reports similar experience with growing turkeys.



SWINE

Usage levels for canola meal

Current Canadian recommendations on the use of low-glucosinolate rapeseed meal in rations for swine are as follows :

- starting rations – 12 %
- growing rations – 12 %
- fattening rations – all supplemental protein
- breeding rations – 12 %.

In three experiments Aherne, at the University of Alberta, has shown that increasing the level of CM above 8 % in rations for starting pigs (6 to 20 kg liveweight) reduced average daily feed consumption and average daily gain. Anderson, at the Nova Scotia Agricultural College, found that increasing the level of CM in starting rations above 10 % had an adverse effect on feed/gain ratio. Hence, it would appear that the maximum level for using CM in rations for starting pigs is of the order of 8 %.

On the subject of complete replacement of SBM with CM in rations for 23 to 45 kg pigs, Bell and Keith, at the University of Saskatchewan, found that supplementing CM containing rations with lysine allowed performance comparable to a ration based on SBM. With pigs in the weight range 45 to 68 kg they found that performance was similar on the CM and SBM-containing rations. However, over the whole period, 23 to 68 kg, the cumulative responses showed that the pigs fed only CM as the protein supplement gained 95 % as fast and required 8 % more feed per unit of gain than the SBM-field pigs. Hence, during the early growing period the level of CM in the ration should be restricted to 12 %.

Nutrient availability

Sauer, at the University of Alberta, has reported amino acid availability in CM using the ileal analysis method. The method appears to be very suitable for detecting differences in amino acid digestibilities. Sauer reported decreased digestibilities of essential amino acids for CM in comparison to corresponding values for SBM of the order of 10 %.

Canola screenings

Beams and Tait, at the University of British Columbia, have evaluated canola screenings for pigs and on the basis of their studies have recommended that not more than 5 to 10 % of raw canola seed screenings should be used in growing rations for swine.

Flavor additives

In four experiments Baidoo and Aherne, at the University of Alberta, found that pigs fed flavored pelleted feed containing 35 % CM ate 7 to 21 % more feed than pigs fed non-flavored feed. The use of flavor additives (HySugr ADE and Pig Krave) increased the cost of the feed by 4 %. Since there was no improvement over the SBM control the higher cost of the flavored feed could not be justified.

I am attaching, herewith, a list of projects approved for support under the Canola Utilization Assistance Program for 1985. The list gives the names and addresses of most of the researchers that I have referred to in this report.