

NUTRITIONAL EFFECTS OF RAPESEED OILS IN PIGS. 1. PERFORMANCE AND CARCASS CHARACTERISTICS

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1. INTRODUCTION

In the recent literature a lot of work about the influence of rapeseed oil in particular of the erucic acid within this oil is published, on performance, fat composition and health of laboratory animals and farm animals. Despite of the very large number of papers on the different aspects of this complex topic there is still some doubt that erucic acid is the sole cause for the repeatedly described lesions of the heart muscle. Furthermore there is no direct evidence at present time of similar effects of rapeseed oil in men. In our experiments we used pigs, since results from experiments with this species give a better basis for analogous conclusions than results from experiments with rats. Until now there are even conflicting results about the effects of rapeseed oil in pigs. One of the reasons for this may be the preparing and feeding of the animals, for instance housing and management of the animals, nutrient balance of the diet, feeding regime, and state of health.

The aim of this laborous collaborative experiment is to investigate the influence of type, level, and erucic acid content of the dietary fat on performance and carcass characteristics (this paper), composition of tissue lipids (1), and frequency and severity of myocardial changes (2) in growing pigs.

2. EXPERIMENTAL

Ninety-four barrows (german Landrace pigs from a SPF-herd) were fed for 17 weeks barley-soybean meal diets containing either soybean oil or three mixtures of rapeseed oils (Primor with 5 % erucic acid and a rapeseed oil with 48 % erucic acid) each at levels of 4 % and 8 % by weight (= 6 % and 10 % dietary fat or 15 J % and 25 J % digestible energy, respectively) or a control diet to which no oil was added (= 2 % dietary fat or 4 J % digestible energy) and a diet with 8 % by weight Lesira oil (10 % dietary fat). The protein, mineral and vitamin supplementation was increased with increasing energy density of the ration to ensure a constant energy : nutrient ratio. The final concentration of erucic acid in the dietary fat was 7.5 %, 15.0 % and 22.5 % for the three mixtures of rapeseed oils, and 1.7 % for the Lesira oil. The pigs were kept single in pens without straw bedding. Feeding was twice daily on an energy scale based on live weight. Water supply was ad libitum with nipples.

3. RESULTS

Live weight gain was very similar in all 10 groups; the mean daily gain was 0.76 kg (0.75 to 0.78 kg). During the first six weeks growth was slightly higher in the rapeseed oil groups in comparison to the other groups. However, this advantage diminished during the last five experimental weeks. The increase of the erucic acid content from 7.5 % to 22.5 % had no effect irrespective of the fat level. The growth of the animals in

the Lesira group was somewhat different from that of the animals in the other fat supplemented groups. During the first twelve weeks it was the same as with the control diet, but for the last five weeks it was higher than in all other groups. The energy conversion ratio was just the opposite of the daily gain, whereas the feed conversion ratio reflects the different energy concentration of the diets.

There were no significant effects of the different treatments on carcass quality and on the weight of kidneys, heart, spleen, liver, and thyroid gland. The weight of the adrenal glands was remarkable smaller in the groups with 7.5 %, 15.0 %, and 22.5 % erucic acid than in the other groups. This is in contrast to the repeatedly described enlargement of the adrenal glands in rats fed rapeseed oil as reviewed by Beare-Rogers (3).

4. CONCLUSIONS

The objectives of this part of the experiment was to study the effects of type, level, and erucic acid content of the dietary fat on performance, carcass characteristics and weight of several organs in growing pigs. None of these factors had a significant influence on the parameters mentioned above. The enlargement of the adrenal glands as a result of feeding erucic acid is an additional proof for differences between rats and pigs in fat metabolism.

LITERATURE

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