

Effect of nutrition on growth rate body composition and carcass quality

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Quantity and firmness of adipose tissues, a major factor of carcass quality, vary according to genotype and diet of the animal.

Whatever the genotype and the diet offered, the heavier the animal, the more its weight gain is rich in lipids and the fatter it becomes. This evolution begins earlier in lambs of small-sized breeds. Thus, it is necessary to choose a breed well-suited to the type of carcass desired, if high quality carcasses are to be produced.

The nutrition of a given genotype can modify the weight of the fat deposits. The main factors and their effects are the following:

— when the percentage of crude protein augments from 10 to 16-18 per cent, growth rate increases and percentage of carcass fat decreases. There is no supplementary effect beyond 16-18 per cent of crude protein and these effects are less when the animal is slaughtered at a late stage of maturity, i.e. with a weight approaching the adult weight of the breed;

— the energy concentration of the diet does not modify the carcass composition when the lambs receive the same quantity of metabolisable energy;

— when growth rate is decreased by reducing the food supply, fat percentage in the carcass decreases but this effect is very limited and some authors even observe a reverse effect when nitrogen supply is too low or when nitrogen is extensively fermented in the rumen;

— this reduction of energy supply cannot be obtained by using low concentration diets during the fattening period; with such diets the lamb consumes more dry matter and the same quantity of energy;

— the origin of feeds offered can also modify body composition. For example, with spring barley offered *ad libitum*, a leaner carcass is obtained than with maize. On the other hand, if lambs receive the same quantity of metabolisable energy, maize gives fewer large fat deposits than barley or wheat.

Quality of fat deposits (firmness) depends on nutrition before and after weaning.

Before weaning, milk replacers which contain only tallow as a fat source or milk with a low percentage of fat (less than 20 per cent) give soft fat which is rich in water and in insaturated fatty acids. The fattening diets rich in cereals or entirely ground give the same defects. To avoid this, it is necessary either to give at least 20 per cent of long forage, or to use whole grains or to reduce the quantity of concentrate offered at the end of the fattening period.

The metabolic origin of the soft fats is discussed and, in conclusion, the effect of the breed and/or selection on the fat content of the carcass is stressed again.