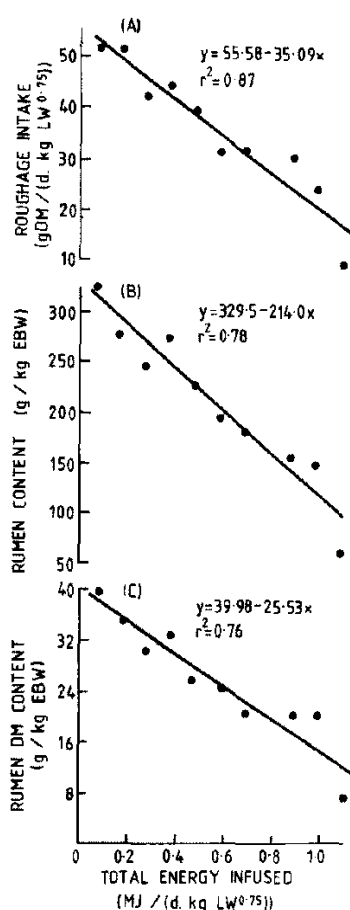


INFLUENCE OF NUTRIENT DEFICIT ON RUMEN CONTENT AND VOLUNTARY INTAKE OF ROUGHAGE BY SHEEP

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Voluntary feed intake by sheep may be limited by the potential of the animal to use nutrients, the amount of digesta that can accumulate in, and its rate of removal from, the rumen or the time required to consume feed that is either difficult to masticate or not readily accessible. Weston (1984) observed rumen digesta load to be inversely related to net energy intake in young sheep fed roughage diets that failed to meet their capacity to use nutrients. He postulated that with such diets, digesta load may be related to the energy deficit; that is, the difference between the capacity of the animal to use energy and the energy available to it from diet. However, the roughage diets used varied widely in chemical and physical properties that could affect digesta load (e.g. digestibility, palatability and packing density). Accordingly, an experiment was conducted in which a single roughage diet was offered to sheep and their energy balance was altered by the infusion of a balanced nutrient mixture.



A liquid diet of reconstituted full cream milk, sodium caseinate, vitamins and minerals was infused for 30 to 49 days into the abomasum of 24 male, crossbred lambs offered a low quality, chopped (25 mm) wheaten hay to appetite. Sufficient caseinate was given to ensure that protein was not limiting at the tissue level (Black and Griffiths 1975). Two or three lambs in each of 10 treatments were given the liquid diet when liveweight (LW) ranged from 18 to 31 kg depending on the energy it supplied (0.08 to 1.1 MJ/(d.kg LW^{0.75})). The roughage contained added urea, sulphur and cobalt, and was offered in excess (20%) of expected consumption. When approximately 31 kg, the animals were killed and the wet and dry matter (DM) content of the rumen and the empty bodyweight (EBW) were determined.

Lambs offered roughage and infused with caseinate alone grew at 34 g/d. As the amount of nutrients infused (EI, MJ/(d.kg LW^{0.75})) increased, roughage intake declined (Fig. A) and growth rate increased (GR, g/d) linearly:

$$GR = 362.6 EI - 5.31 \quad (r^2 = 0.89).$$

The linear increase in LW indicates that roughage was not substituted for nutrients infused on a direct energy basis. However, the decline in intake was paralleled by a decline in rumen digesta (Fig. B) and rumen digesta DM content (Fig. C) suggesting that rumen content increases as the gap between nutrient supply and demand widens in lambs eating a single roughage diet.

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