

NEURAL DEPRESSANTS AND THE VOLUNTARY CONSUMPTION
AND DIGESTION OF ROUGHAGE DIETS

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Studies have been made of the effects of phenobarbital sodium and the benzodiazepine, elfazepam*, on roughage consumption and various aspects of digestion in the sheep.

Groups of sheep were offered over 7 or 14 day periods a diet of lucerne and wheaten hays (3:2) ad libitum together with 80 g protein supplement daily which contained 0, 7.3 or 13.5 mg elfazepam. Roughage intake was 7-8% higher ($P < 0.01$) at both levels of elfazepam administration. In digestion studies conducted using techniques similar to those described earlier (Weston, 1971) sheep prepared with rumen and abomasal fistulae received 900 g/day of the above roughage together with 50 g protein supplement providing 0 or 13.5 mg elfazepam daily. Elfazepam was associated with increases ($P < 0.05$) in organic matter digestibility (2%), N digestibility (1%), liquor volume in the rumen (7%) and residence times of marker $^{51}\text{Cr-EDTA}$ in the rumen (5%) and intestines (7%). Groups of sheep accustomed to a conventional roughage diet were changed to a low palatability straw diet and given 80 g protein supplement daily containing 0 or 13.5 mg elfazepam. During the first six successive days following diet change, the sheep receiving no elfazepam progressively increased their intake of straw diet from 261 g/day to 684 g/day. Those receiving elfazepam consumed 62% more feed on the first day ($P < 0.01$) and by the second day had achieved the feed intake level shown by the control group on the sixth day.

Groups of sheep were offered over a period of 8 days a diet of wheaten and lucerne hays (1:1) ad libitum together with 100 g/day of pelleted diet containing 0 or 1 g phenobarbital sodium. The barbiturate increased roughage intake by 5.4% ($P < 0.01$). With the same diet offered at 900 g/day to fistulated sheep the administration of phenobarbital sodium by continuous infusion per abomasum increased ($P < 0.05$) both rumen liquor volume (+ 18%) and the residence time of marker $^{51}\text{Cr-EDTA}$ in the rumen (+ 20%). Sheep offered wheaten hay ad libitum were given 400 g/day of lucerne pellets providing 0, 1.0, 1.5 or 2.0 g phenobarbital sodium. With increasing level of drug administration, wheaten hay intake increased by 0.8%, 2.2% and 3.7%, the mean increase with all levels being 2.2% ($P < 0.05$). In all experiments, intake was lower ($P < 0.05$) by some 7% in the three days following cessation of barbiturate administration than in control periods.

The neural depressants possibly increase roughage intake by reducing the sensitivity of hypothalamic areas to inhibitory stimuli relating to rumen digesta load and low palatability. The decreased propulsive activity of the alimentary tract, as indicated by increased marker residence times, may impose limits on the roughage intake response but probably contributes to the observed increases in nutrient digestibility.

* 7-chloro-1[2-(ethylsulphonyl)ethyl]-5-(2 fluorophenyl)-1, 3-dihydro-2H-1, 4-benzodiazepin-2-one.

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