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**A STUDY OF THE EFFECT OF THE DIGESTIBILITY
OF HAY ON ITS FEEDING VALUE, WHEN GIVEN TO
LACTATING COWS GRAZING ON PASTURE**

A thesis presented in partial fulfilment of
the requirements for the degree of
Master of Agricultural Science
Department of Animal Science
Massey University, Palmerston North
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1990


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ABSTRACT.

Sixteen cows with an average milk yield of 20 litres per day, were randomly allocated to two treatment groups. One group was supplemented with high digestibility hay (57.3% DMD) while the other group was supplemented with low digestibility hay (52.0% DMD). Cows in both treatments grazed on pasture during the night time and were stall-fed with either high or low digestibility hay during the day time. The pastures were predominantly of perennial ryegrass (*Lolium perene*). The experiment was carried out for 28 days in September 1988.

The two treatment groups were given a common pasture allowance of 11-12 kgDM per cow per 12 hour period of grazing. Hay intake (fed *ad libitum*), pasture intake, milk yield, milk composition, liveweight and condition score were measured.

Herbage intake was estimated by the sward cutting technique and was 3.85 and 4.30 kgDM per cow per day for the high and low digestibility hay groups respectively. The difference between the groups in intake was significant ($P < 0.05$). Daily intake of high digestibility hay (8.65 kgDM per cow) was significantly ($P < 0.0001$) greater than the consumption of low digestibility hay (6.53 kgDM per cow). The estimated values for daily metabolisable energy intake were 115 MJ per cow and 99 MJ per cow for the high digestibility and low digestibility hay groups respectively. Residual herbage mass was slightly higher (1130 v 1100 kgDM per hectare), but not significantly, when cows were supplemented by high digestibility hay. Substitution rate for the increase in hay intake was -0.45 kgDM pasture intake for an increase of 2.12 kgDM of hay intake or 0.21 kgDM pasture per one kgDM increase in hay intake.

Cows fed on the high digestibility hay produced slightly more milk than those on the low digestibility hay. The difference was significant ($P < 0.01$) in week 1 but not significant thereafter. Yields of milk constituents were also slightly increased for cows fed on the high digestibility hay.

Digestibility of hay had small and insignificant effects on the concentrations of milk fat, milk protein and milk lactose. However the concentration of milk fat and milk protein were slightly higher for cows fed low digestibility hay. Cows fed high digestibility hay gained significantly more liveweight ($P < 0.05$) and condition score ($P < 0.01$) than cows fed low digestibility hay.

The total intake in cows fed on high digestibility hay was significantly ($P < 0.001$) higher than in cows fed on low digestibility hay. It was estimated that hay intake increased by 0.40 kgDM per unit rise in hay digestibility and milk production increased by 0.23 kg milk per unit rise in hay digestibility. The increase in hay intake and milk production per unit rise in digestibility is normally similar to other studies with which the range response of -0.12 to 0.72 kgDM increase in intake per unit rise in digestibility and 0.00 to 0.93 kg milk increase in milk yield per unit rise in digestibility. However the present study was the only experiment for dairy cows grazing on pasture.

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