PREDICTING DIGESTIBILITY OF CEREAL GRAIN-HAY RATIONS FROM WHOLE GRAIN IN FAECES

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Measurements of the digestibility of whole wheat fed to cattle in stalls suggested that the productive response of feeding whole wheat would be unsatisfactory (Toland 1976). However, Pryor and Laws (1972) found no difference in production when feeding rolled or whole wheat. This discrepancy highlights the need for digestibility measurements which are relevant to all feeding conditions.

During a digestibility trial in which eight yearling steers were fed a mixed ration of $\frac{2}{3}$ whole wheat and $\frac{1}{3}$ hay at $1\%$ and $3\%$ of mean live weight (Toland 1978), measurements were made of concentration of whole grain in faeces. Apparent digestibility of the ration was determined from seven-day total collections of faeces, and whole grain voided was measured daily by washing all the faeces (minus samples) and sedimenting the apparent whole grain in water. Faecal samples and grain were dried at $100^\circ C$ for at least 24 h.

A maximum ration digestibility value ($A$) of 82.2 ± 0.2% (mean ± SE) for nil apparent whole grain in the faeces was used in an asymptotic regression equation for digestibility of the ration ($Y$) on concentration of whole grain in the faeces ($x$), $Y = A - Be^{C|x|}$. The A value was determined for the 16 measurements by adding the digestibility of the ration to the digestible value of the amount of whole grain voided, assuming a maximum digestibility of grain dry matter of 86.1% (Toland 1976).

The high correlation between ration digestibility and concentration of whole grain in the faeces suggests that reliable estimations of ration digestibility can be made from faecal whole grain concentrations. To use this form of relationship, the A value must be established for all animals fed under similar conditions. Total collection of faeces from at least four animals would be necessary to measure values of digestibility and whole grain voided. Grab samples of faeces from animals in groups could be taken and whole grain concentrations in the faeces determined by sorting. Individual animals can then be ranked in efficiency of digestion of whole grain.


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140.