Comparison of in situ and in vitro methods for predicting in vivo fiber digestion.

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INTRODUCTION
Estimates of in vivo NDF digestibility by in vitro TTNDFD® have been demonstrated to be closely correlated. The in situ TTNDFD® method would be a useful alternate method for predicting in vivo NDFD if validated.

OBJECTIVE
Compare potentially digestible NDF (pNDF) and pdNDF digestion rate (kd), using in situ (IS) or traditional in vitro (TR) rumen digestion assays, and compare subsequent estimates of total-tract NDF digestibility (TTNDFD) to in vivo (IV) TTNDFD measurements.

MATERIALS AND METHODS
9 feed samples of high and low digestibility corn silage, high fiber concentrates, and haylage were coded so the laboratory could not identify the samples or replicates.
• All feed samples were previously characterized in vivo for pdNDF, kd, and TTNDFD.
9 timepoints were used in replicated runs, using 2 method
• 6, 12, 24, 30, 48, 72, 96, 120, and 240h
• In vitro rumen digestion
In situ rumen digestion
• 0.5g, 2mm Udy mill ground placed in flasks with Van Soest buffer
• Rumen fluid from 2 cows was pooled and immediately used to inoculate samples
• 2 replicated runs

Statistical Methods
• Ingredient results were mathematically combined to compare to in vivo results
• SAS JMP (v11.0) nonlinear option for exponential decay model to determine pdNDF and kd for each method. TTNDFD was then calculated from those values.
• Student’s T-test was used to compare techniques.

DEFINITIONS
pNDF – potentially digestible NDF
iNDF – indigestible NDF
NDF = pNDF + iNDF

DISCUSSION
• Tradition in vitro results in a faster rate of digestion for feeds and greater estimate of TMR TTNDFD compared to the in vivo results (P<0.01).
• In situ predictions of TTNDFD resulted in greater variability than the traditional in vitro methods, but did not differ from in vivo results.

CONCLUSIONS
• In situ NDFD assay can be used to predict the TTNDFD in corn silages, haylage, and concentrates.