Prediction of dietary crude protein in sheep and goats with near infrared reflectance spectroscopy of feces (FNIRS): an independent validation.

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Prediction of diet quality using FNIRS has been reported for several species of livestock and wildlife, including sheep (*Ovis aries*) and goats (*Capra hircus*). Few evaluations of the technique for small ruminants in the US are found outside of the research in which the original calibrations were reported. The objective of this study was to determine the ability of FNIRS to predict dietary crude protein (CP) in pen-fed sheep and goats. Seven sheep (63 ± 5.0 kg) and seven goats (50 ± 5.0 kg) were maintained in individual concrete floored (1.5m x1.5m) pens with *ad libitum* water. Each animal was sequentially offered 1 of 7 experimental diets in 7-day feeding trials until each animal received each diet. Diets consisted of either timothy (*Phleum pratense*), bermudagrass (*Cynodon dactylon*), or alfalfa (*Medicago sativa*) forages, all equal combinations of each pair of forages, and an equal combination of all three. Diets were offered at ~3 % BW and adjusted to supply ~10 % over voluntary intake. Forages were chopped to ~9.8 cm length prior to mixing. Forages were sampled and analyzed for CP. Diet CP was calculated based on proportion of each forage in a diet. Orts were visually assessed but not collected. Fresh fecal samples were collected from the pen floor on day 7 and processed for FNIRS. Spectra (1100 to 2500nm) were obtained on a Foss® 6500 scanning monochrometer with spinning cup. Previously published FNIRS calibrations for dietary CP in both sheep and goats were applied to the respective spectra. Relationships between observed diet and FNIRS predicted CP were analyzed by simple linear regression. The r^2 and SE of prediction were 0.97 and 0.75 for sheep. Similar values were 0.77 and 2.19 for goats. Individual animal variation ranged from 4 to 27% of the mean FNIRS predicted CP for each diet in sheep and from 10 to 37% in goats. Goats exhibited greater selectivity for leaf over stem in the low CP diet than did sheep. FNIRS successfully predicted dietary CP in pen-fed sheep and goats. Individual animal variation in FNIRS predicted dietary CP was greater in goats than in sheep.

KEYWORDS
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