



Exploratory analysis of fecal NIR spectra similarity of goats and sheep grazing Brazilian Northeastern rangelands

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The prediction of the diet quality consumed by goats and sheep grazing in the Caatinga biome is challenging, mainly due to differences in dietary habits and botanical diversity of this biome. The discussion on the use of fistulated animals by ethics committees reduced the research in this area, despite its great economic and social importance. The fecal NIRS technology can be used to monitoring the diet quality without affecting animal welfare, but requires that a representative database is built. If models developed for goats could be used for sheep and vice versa, it will reduce the number of experiments to build such models. This experiment was carried out a classification analysis as a first approximation to evaluate the possibility of using models developed with a species in the diet parameters of another. Two 12-months on-field trials was carried out in Pernambuco State (08°04'25''S, 37°15'52''W), where fecal samples were collected during six consecutive days a month, totalizing 360 goats and 300 sheep's samples, obtained from 24h fecal bags. Samples were dried in forced air oven to 50°C and their diffuse reflectance spectra were obtained by using a NIR Perten® DA 7500 spectrometer (Perten Instruments, Hägersten, Sweden), in the animal nutrition laboratory of Embrapa Goats and Sheep. The measurement was repeated twice for each. Multiple Scatter Correction (MSC) was applied to correct scattering effects. Samples were classified ($P < 0.05$) using Soft Independent Modeling of Class Analog (SIMCA) methods by using The Unscrambler® software (Camo Inc, Oslo, Norway). First, sample do not identified as membership of their own class were assigned as outliers and removed from the data set ($n=23$ goats' database and $n=24$ in the sheep's). All sheep samples were identified as similar to goat database, while in the sheep model, 97% of goat samples feel

into critical limits. When analyzed by season, it was observed that all goats' samples were recognized as similar to sheep database in the dry season and transition dry to rainy. However, in the rainy season and the transition dry to rainy were observed the lowest percentages of similarity 98.0 and 94.0%, respectively. The differences, though small, seem to be related to availability and botanical diversity of the rangeland, associated with the differences in grazing habits between species. The goats exhibiting greater plasticity in the diet selection, have a higher variation in the diet consumed, encompassing that selected by sheep. In periods of transition dry/rainy season, as well as, in the rainy season, the preference of sheep by herbaceous species may have influenced to reduce the similarity. On the other hand, in the dry season, litter, consisting of senescent leaves are the main or only source of feed for both making close the diet and the similarity of diets for both species. The fecal spectrum during the dry season is similar between goats and sheep grazing the same area. Even in periods of greater availability and variety of forage species, goats may be used to generate fecal NIR models applicable to both species.

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