

Reduced-Lignin Alfalfa in Water-Limited Environments

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Introduction: Alfalfa (*Medicago sativa* L.) hay production has decreased by 16% nationwide in the last ten years. However, Oklahoma's harvested area was twice reduced compared to the national area (33.8%). The lack of best management practices for reduced-lignin alfalfas contributed to this abrupt alfalfa area reduction. With the introduction of reduced-lignin cultivars, producers decrease the number harvests while maintaining similar quality and quantity to that of conventional cultivars. Although reduced-lignin alfalfa cultivars have been found to be beneficial in other regions, their performance is unknown in water-limited environments, such as central and western Oklahoma.

Purpose: The objective was to compare aboveground dry matter (ADM) and quality of a reduced-lignin with three reference alfalfas at different harvest intervals in central and western Oklahoma.

Methods: A two year-location study was established near Lahoma and Stillwater, Oklahoma in 2019. The experimental design was a split-plot arranged in 3x4 factorial with 4 replications. Harvest schedules (28, 35, and 42-day) were the main plots. The reduced-lignin, 54HVX41, and three reference cultivars, 54VR10, DKA44-16RR, and WL356HQ.RR, were the subplots. A sample of 1 m² was taken from the center of each subplot at its assigned harvest interval. Samples were dried at 55°C until a constant weight was achieved and dry matter was determined. Samples were ground to pass through a 1-mm sieve. NIRS analysis was used to estimate forage quality factors of crude protein (CP), acid detergent lignin (ADL), and in vitro dry matter digestibility 48 hours (IVTDMD).

Results: First year results indicated the ADM was not different between 35 and 42-day harvest intervals. The 35-day interval had higher CP, IVTDMD, and lower ADL, resulting in higher quality. Alfalfa harvest at 28-day intervals accumulated the least ADM. However, its CP and IVTDMD were 1.7-2 and 0.6-2 percent points greater than 35-day, respectively. Furthermore, ADL decreased 0.2-1 percent points. This indicated superior quality in alfalfa harvested at 28-days. Among cultivars, the reduced-lignin had less ADM than reference cultivars, but concomitantly it showed increased forage quality, i.e., higher crude protein, IVTDMD, and lower ADL.

Significance: Results thus far indicated that the reduced-lignin cultivar delivered higher quality than reference cultivars; this higher quality is accompanied with a yield penalty. A second year will be performed to confirm findings. Once completed, predicted animal gain models and economic analysis will be performed to identify the most profitable cultivars and the impacts of exchanging forage yield with forage quality.

Keywords: Reduced-lignin, dryland.