

Project No. 79-R3 - Tree and Crop Research
Nutritional Value of Almond Hulls for Dairy Cows

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Objectives: To determine degree of variation in chemical (nutrient) content in almond hulls from different areas and varieties and the relationship of chemical constituents of almond hulls to ruminant digestive function and nutritive value for dairy cattle and other ruminants.

Interpretive Summary: Crude fiber is the index currently used to evaluate almond hull feed quality. It actually serves as an index of shell contamination rather than an indicator of hull nutritive value. Studies done as part of this project continue to substantiate this. Laboratory fermentations demonstrate that the amount of crude fiber in hulls contribute little to explaining feed value of hulls not contaminated with shells. In fact, crude fiber can unfairly discriminate against some varieties. For example, NePlus hulls are consistently higher in crude fiber than Nonpareil and Merced hulls, but the feed value of all three may be comparable. Digestion studies currently underway will clarify this issue further.

There has been interest in using soluble sugars as an index of nutritive value. Laboratory fermentations indicate that variations in soluble sugar contribute little to defining differences in hull fermentability. Apparently differing levels of other fermentable components in hulls such as starch, pectin, hemicellulose and cellulose influence value.

Acid detergent fiber (ADF) is a very good index of nutritive values of many feed-stuffs. Laboratory fermentations indicate that ADF may be the most accurate commercially available laboratory analysis that could be used as an index of hull feed

value. Besides being the most promising index tested, the analysis for ADF is relatively simple and accurate. This is not the case for the analysis of soluble sugars. The results obtained from laboratory fermentations must be evaluated on the basis of cow digestion studies currently underway. Three hull varieties are being analyzed (Nonpareil, Merced and NePlus) and the results will be available in about three months.

A performance study with lactating dairy cows has been done. Alfalfa was replaced in the experimental diets with almond hulls and urea to maintain constant crude protein and net energy values for the different rations. The control diet contained alfalfa, barley and cotton seed meal and no hulls or urea. One test diet had 12.5 percent almond hulls and 0.5 percent urea. The other test diet had 25 percent almond hulls and 1 percent urea. Animal performance on the three diets was essentially identical, indicating that almond hulls can comprise 25 percent of a dairy cow diet. A more comprehensive report on this project is available from the Almond Board.