

Project Progress Report

January, 1979

Nutritional Value of Almond Hulls for Dairy Cows

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The objectives of the study are to develop improved methods of evaluating almond hulls as a feed for dairy cattle and other ruminants. The procedures being used are to determine the variability of specific chemical (nutrient) components in different hulls, relate these components to digestion and fermentation through laboratory methods using stomach contents of rumen-fistulated cows and finally to test these relationships in feeding trials with both fistulated and lactating cows.

Results reported previously have shown that hulls vary considerably in concentrations of materials such as crude fiber, ether extract and ash which are routinely determined in feedstuffs. Preliminary data indicated that crude fiber may not be a good estimator of nutritional value. Further results have been obtained which further question the value of crude fiber alone as an estimator. Soluble sugars are a major component of hulls and are probably primary determinants of rate of digestion and fermentation. Soluble sugar content of hulls decreases with increasing crude fiber (Figure 1), but the relationship appears to be different for different varieties. The relationship between soluble sugars and acid detergent fiber (ADF) appears to give a much better fit across all varieties (Figure 2). However, the relationship between cellulose and ADF may be different for Neplus hulls as compared to the other varieties (Figure 3). This means that a combination of determinations such as ADF, cellulose and soluble sugars may give us the best estimation of nutritional value and optimum ration formulation of almond hulls. These relationships are being tested in laboratory digestions and fermentations and will be further evaluated in animal studies with rumen fistulated and/or lactating dairy cows.

Interpretive Summary:

Total soluble sugars and cellulosic materials are two of the major components of almond hulls and other feedstuffs which affect rates of digestion and fermentation, and thus, optimum utilization in rations. Chemical analyses of hulls shows a much better relationship between soluble sugars and acid detergent fiber (ADF) across a variety of samples as compared to soluble sugars and crude fiber. However, the relationship between ADF and cellulose shows greater variability and appears to be affected by hull variety. Thus, a combination of specific chemical determinations may be the best indicators of feeding value. The relationships between chemical components and nutritional value are being tested in laboratory digestions and fermentations and will be further evaluated in studies with rumen fistulated and/or lactating dairy cows.

Figure 1. Relationship Between Soluble Sugars and Crude Fiber in Almond Halls.

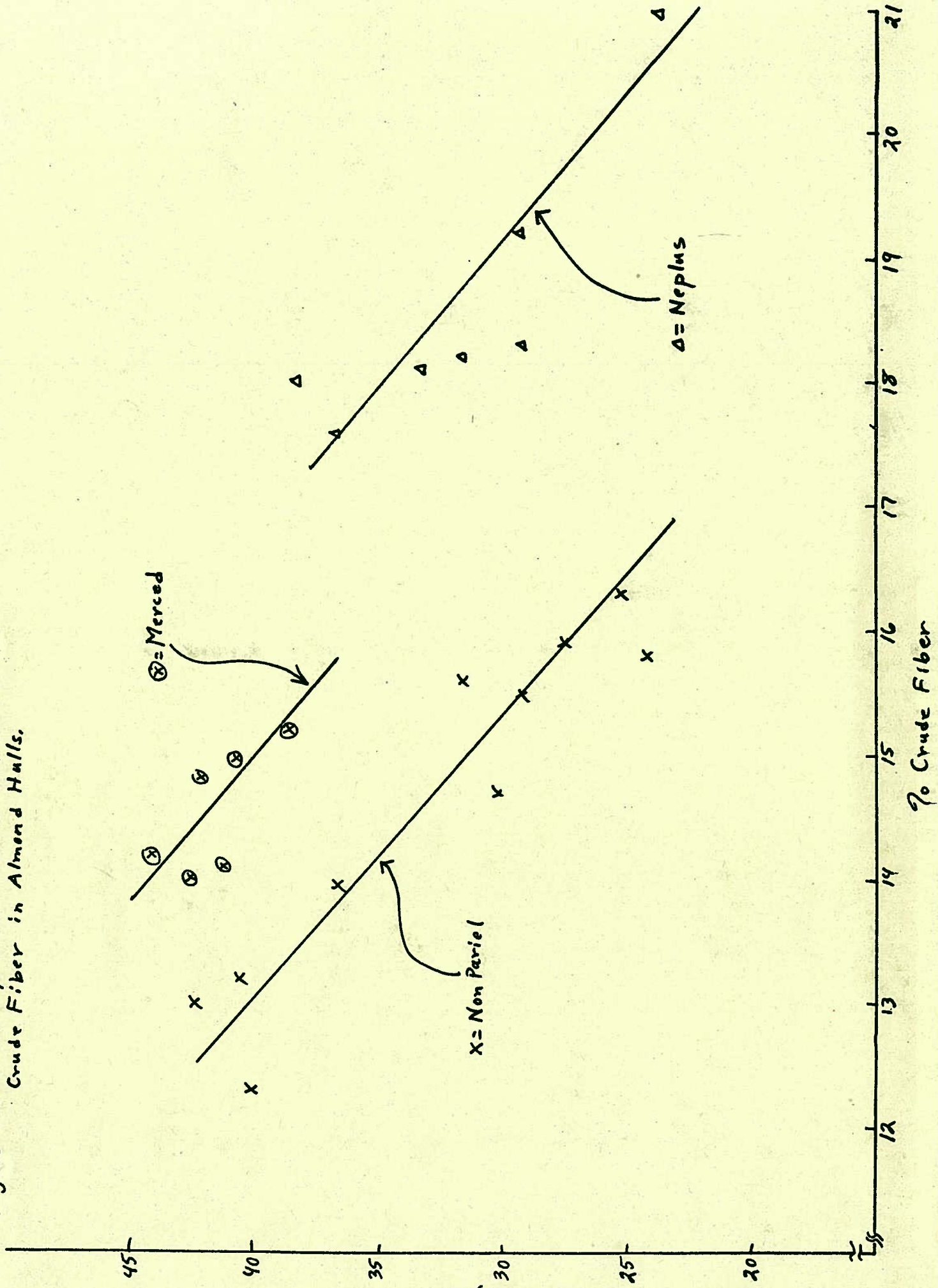


Figure 2. Relationship Between Soluble Sugars and Acid Detergent Fiber (ADF) in Almond Hulls.

