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Ration fiber analysis

Abstract

For many years, fiber in dairy rations was measured and expressed as crude fiber. More recently acid detergent fiber (ADF) and neutral detergent fiber (NDF) have been used. The crude fiber (CF) determination uses acid and alkali treatment and is an attempt to simulate reactions within the digestive tract, whereas the newer techniques use detergents and attempt to divide the plant cells into their component parts. Thus, NDF is resistant to breakdown by a certain detergent in neutral solution and represents the structural part of the cell, the cell wall. Acid detergent fiber is resistant to breakdown by a certain detergent in acid solution and contains cellulose and lignin, the most undigestible carbohydrate fractions.; Dairy Day, 1986, Kansas State University, Manhattan, KS, 1986;

Keywords

Kansas Agricultural Experiment Station contribution; no. 87-88-S; Report of progress (Kansas Agricultural Experiment Station); 506; Dairy; Ration; Fiber analysis; Crude fiber; Acid detergent fiber (ADF); Neutral detergent fiber

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RATION FIBER ANALYSIS

J. L. Morrill

For many years, fiber in dairy rations was measured and expressed as crude fiber. More recently acid detergent fiber (ADF) and neutral detergent fiber (NDF) have been used. The crude fiber (CF) determination uses acid and alkali treatment and is an attempt to simulate reactions within the digestive tract, whereas the newer techniques use detergents and attempt to divide the plant cells into their component parts. Thus, NDF is resistant to breakdown by a certain detergent in neutral solution and represents the structural part of the cell, the cell wall. Acid detergent fiber is resistant to breakdown by a certain detergent in acid solution and contains cellulose and lignin, the most undigestible carbohydrate fractions.

During the past two decades, ADF has tended to replace CF as a way of expressing fiber levels in rations. More recently, research has indicated that NDF measurement may be more useful than either CF or ADF, especially for high-producing cows. As production increases the energy requirement increases, and it becomes more difficult to provide sufficient fiber in the ration, regardless of the fiber method used. Also, since all of the fiber determinations are based on chemical methods, they do not express particle size of the feedstuff. Ruminants require a certain amount of coarsely textured feed to support normal rumen fermentation. Dr. D.R. Mertens has proposed some guidelines for fiber content of dairy rations, depending on daily milk production (Table 1). Probably, these will be modified as more research results are available, and in the future, rations will be balanced by considering both ADF and NDF.

Table 1. Recommendations for fiber content of dairy rations

Milk Production lb/day	ADF %	NDF %
<30	31	45
30-46	28	39
46-64	24	33
>64	21	27
Dry	34	49