

In Vitro Stimulation of Forage Fiber Degradation by Ruminal Microorganisms with *Aspergillus oryzae* Fermentation Extract

VINCENT H. VAREL,^{1*} KELLY K. KREIKEMEIER,¹ HANS-JOACHIM G. JUNG,²
AND RONALD D. HATFIELD³

Roman L. Hruska U.S. Meat Animal Research Center, Agricultural Research Service, U.S. Department of Agriculture, Clay Center, Nebraska 68933¹; Plant Science Research Unit and U.S. Dairy Forage Research Center Cluster, Agricultural Research Service, U.S. Department of Agriculture, St. Paul, Minnesota 55108²; and U.S. Dairy Forage Research Center, Agricultural Research Service, U.S. Department of Agriculture, Madison, Wisconsin 53706³

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Aspergillus oryzae fermentation extract (Amaferm) was evaluated for its ability to influence degradation of brome grass and switchgrass fiber fractions by mixed ruminal microorganisms in vitro. Addition of Amaferm at a concentration of 0.067 mg/ml, which is approximately the concentration found in the rumen ecosystem (0.06 mg/ml), increased the degradation of brome grass neutral detergent fiber (NDF) by 28% after fermentation for 12 h ($P < 0.01$), but had no effect after fermentation for 24 or 48 h. The levels of degradation of both the cellulose and hemicellulose fractions were increased after fermentation for 12 h ($P < 0.01$). Additions of 0.08 and 8% (vol/vol) Amaferm filtrate (12.5 g/100 ml) stimulated degradation of switchgrass NDF by 12 and 24% ($P < 0.01$), respectively, after fermentation for 12 h; when 80% filtrate was added, degradation was decreased by 38%. The concentrations of total anaerobes in culture tubes containing 80% filtrate were 5 times greater than the concentrations in the controls; however, the concentrations of cellulolytic organisms were 3.5 times lower than the concentrations in the controls ($P < 0.05$). These results suggested that the filtrate contained high concentrations of soluble substrate which did not allow the cellulolytic organisms to compete well with other populations. The remaining concentrations of esterified *p*-coumaric and ferulic acids were lower at 12 h in NDF residues obtained from fermentation mixtures supplemented with Amaferm. Because the total anaerobes were not inhibited in fermentation mixtures containing Amaferm, antibiotics are unlikely to be involved as a mode of action for increasing NDF degradation. The possibility that Amaferm contains enzymes (possibly esterases) that may play a role in stimulating the rate of fiber degradation by mixed ruminal microorganisms by removal of plant cell wall phenolic acid esters is discussed.