Chapter 26

Postharvest Treatment of Fibrous Feedstuffs to Improve Their Nutritive Value


Historically, many fibrous and by-product feedstuffs have been overlooked, particularly by U.S. livestock producers, as potential alternative energy sources for ruminants. As the demand for direct human use of cereal grains increases, however, these feedstuffs will be used increasingly in the ruminant livestock production enterprise. Greenhalgh (1984) identified four reasons for the resurgence in interest in the feeding of agricultural residues: (i) new feeding strategies for ruminants that involve fibrous residues; (ii) more precise knowledge of animal nutrient requirements, resulting in the identification of situations where less than maximal nutrition is required; (iii) better supplementation regimens that optimize ruminal digestion and postruminal utilization of nutrients; and (iv) new methods for improving the nutritive value of fibrous feedstuffs themselves. In addition, changing agricultural strategies, future political realities, and continuing research to understand and overcome the barriers to microbial fermentation of lignocellulosics may increase the attractiveness of crop residues as feeds for ruminants. Current trends toward sustainable agriculture, with its emphasis on decreased reliance on fertilizer, herbicides, and pesticides, may result in lower U.S. yields of cereal grains. Cereal grains for livestock production therefore may increase in cost because of decreased availability. Additionally, international pressure exists to reduce the disparity in standard of living between developed and underdeveloped countries and may help to redistribute food resources. As a result, cereal grains may become less available to livestock producers in developed countries. Finally, steady progress in understanding and overcoming the barriers to microbial fermentation of lignocellulosics, particularly through chemical treatments, has greatly improved the feeding value of crop residues.

Agricultural residues are in plentiful supply. Approximately 1 kg of residue is produced for each kilogram of grain harvested. This ratio of grain/residue translates into an excess of 400 Tg of crop residue produced