Chapter 12

Cell Wall Polysaccharide Interactions and Degradability

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Forages are used extensively in the animal industry around the world. If a greater percentage of the total potential energy stored in forages was available to the ruminant, it would have a tremendous economic impact with increased profitability. Increased forage usage would have positive effects on the environment. In the USA, the growing problem of groundwater quality and maintenance of productive farmland will require greater emphasis on the effective utilization of forages, particularly the grasses. Legume forages have the advantage of enriching the soil through N₂ fixation, whereas grass forages may provide N sinks with which to dispose of N-rich animal wastes. Economic productivity to the individual farm also must be improved by using the biomass accumulated in these crops, particularly in farming systems (such as dairy operations) where high production demands high energy inputs.

As forages mature, the quality generally declines and is related to a decrease in the digestibility of cell wall components. In addition, as the plant matures, more biomass is accumulated in the cell walls and the proportion of cell solubles (rapidly digested material including protein) decreases. High-quality forage can be produced today by harvesting at an immature stage (high protein and high digestibility) more frequently during the growing season. The question is not whether it can be done but whether it is the most efficient and cost-effective means of production. Such plans result in harvesting at low biomass accumulation. This demands more frequent harvests that translate into increased production costs (equipment depreciation, fuel cost, and more frequent stand re-establishment). Forage grasses are not used extensively in the USA in high production systems because of overall lower quality. Increased utilization of forages will involve the selection of plants that produce readily digestible biomass even at later maturity stages, or development of treatments that can compensate for environmental con-