Forage quality can be defined as the relative performance of animals when herbage is fed ad libitum to livestock. It is the product of nutrient concentration, intake potential, digestibility, and partitioning of metabolized products within the animal. In addition to the direct response of animals to forage quality, animal performance also is influenced by many nonforage factors such as animal genetics, animal physiological state, and animal environment as well as interactions between forage and animals. Because of limitations associated with cost and time in using animals, however, forage quality often is estimated by in vitro or chemical means.

Generally, the organic matter of cool-season grasses and most other forages is too low in digestibility to fully meet the energy needs of moderate- to high-producing herbivores, especially as forages near maturity. Cell walls, composed of polysaccharides, lignin and phenolics, proteins, cutin, silica, and water, are major limitations to digestibility. Cell contents, contained within cell walls, consist of organic acids, proteins, lipids, soluble minerals, and soluble carbohydrates, which are all usually highly digestible and readily available. Cool-season grasses normally have a higher cell-wall concentration than legumes, especially in leaves, and a lower cell-wall concentration than warm-season grasses. Often the detergent-fiber system is used to estimate cell-wall concentrations in forages (Goering & Van Soest, 1970; Van Soest & Robertson, 1980). With this system,