A map could be drawn of the evolution of near infrared reflectance (NIR) spectroscopy for the analysis of oilseeds and coarse grains. It could begin in the 1960s with attempts to measure moisture content of ground seed and with an early investigation by Massie and Norris (42) of the near infrared absorption spectra of a diverse collection of seeds of agricultural importance, as a prelude to determining the most effective NIR wavelengths for the drying of grain. Where the map would end is not known, as the applications are continuing to unfold. On a related map one could trace the development of the technique itself, including the development of successive generations of spectrometers, spectral transformation techniques, and calibration procedures. It has been the continuous improvement in the procedures that has allowed the development of applications for more difficult analytes. Some landmarks that would be featured on such a map are given in Table 12–1.

Near-infrared has also become a workhorse in process control, with in-line and at-line applications in oilseeds and grain processing, and food production. While it is not the intention in this chapter to review those types of applications, as we try to look into the future and project the next generation of applications it is useful to consider accomplishments in these related fields. Let’s start where it all began.

It was, of course, long known that water is a strong infrared absorber, so much so that water proves to be a common interference in the acquisition of infrared spectra. The principle of spectral overtones, in which a molecular vibration can be excited by electromagnetic radiation at whole multiples of the energy of the principle absorbance, was also understood. Building on this base, Hart et al. (30) reported that they were able to measure the moisture content of corn (*Zea mays* L.) and soybean (*Glycine max* (L.) Merr.) seed by grinding the seed in a fixed weight/volume ratio of methanol and measuring the NIR absorbance at 1930 nm.

From this beginning, the Norris laboratory produced a series of publications relating to the direct measurement of moisture content in seeds through the use of NIR spectrophotometry. The earliest reports concerned the design of NIR spectrometers and NIR-based moisture meters, specifically Birth and Norris (8) and Norris (47, 48). In the earliest reports of practical applications from the Norris laboratory (4, 49), moisture content was measured by relation to absorbance at a single...