



**Figure 6.1** Some optical properties of leaf preparations from *Tulipa spec.* Reflectance and transmittance spectra (a), and absorbance spectra, calculated from the former according to Equation 6.1, (b) were recorded using whole leaves (labelled: intact leaf), leaves with the epidermis stripped off (mesophyll) and epidermal strips (epidermis). Each spectrum corresponds to the mean of four independent measurements of outdoor-grown material recorded with an external integrating sphere (1800-12 integrating sphere, Li-Cor, Lincoln, Nebraska) in combination with an LI-1800 portable spectrometer (Li-Cor). Panel (a) illustrates important aspects of surface optics: (1) removal of the epidermis decreases reflectance at wavelengths greater than 400 nm; (2) reflectance of intact leaves and epidermis is lowest below 400 nm; and (3) reflectance of the intact leaf and epidermis coincide when intact leaf or mesophyll transmittance is minimal between 350 and 480 nm and near 680 nm (see Section 6.4.1 for a discussion of these phenomena). Epidermal transmittance (a) is minimal below 400 nm, which is almost certainly due to the presence of colourless flavonoids located in epidermal cell vacuoles (see Section 6.3.1). The calculated absorbance spectra (b) show that the mesophyll absorbs radiation better than the intact leaf at wavelengths greater than 400 nm, and also, show efficient epidermal absorbance at wavelengths lesser than 400 nm (Jana Leide and E.E. Pfündel, unpublished data).