binders they can still be quite different. Unfortunately, none of the above statements can be generalized. A decision must be made for each case.

For stability tests and quantification of marker compounds, two other aspects are of importance: signal-to-noise ratio (a function of surface smoothness and homogeneity) and reproducibility across plates, and from one plate to another over long periods of time (a function of quality control during the manufacturing process). Only plates from a few reputable manufacturers are able to meet this requirement. In any case, it is desirable to develop a method for use with plates of one manufacturer. If so desired, the suitability of other plate material can be shown during the validation of the method. It should be noted here that silica gel G (for gypsum as binder, nowadays often falsely used, even in many pharmacopoeias, as a synonym for TLC silica gel) is not widely available as a precoated layer today. Gypsum was the preferred binder of "homemade" plates. The layers are soft and not very durable. Modern precoated plates use organic binders, which create harder layers that are not affected during packaging, shipping, and storage.

Another decision to be made is that between TLC and HPTLC plates. There is no general reason why HPTLC plates should not be preferred over the conventional TLC plate. HPTLC plates give better separation and reproducibility and are more sensitive. Although slightly higher in price, HPTLC plates will pay off by significant savings in cost of solvents and analysis time. Typical pharmacopoeial methods require 45 min to 1 h for development on TLC plates. The same or better separation can often be achieved on HPTLC plates in 8–20 min (Fig. 1). Due to smaller particles and more homogeneous packing of the layers, HPTLC plates restrict the flow of the mobile phase more than TLC plates. Therefore the usable separation distance is limited to about 60 mm (see also Sec. II.C).

Upon storage and handling, silica gel will interact with the environment, adsorbing water vapor as well as fumes and dust. This has two consequences: (a) The activity of the plate is dependent on the relative humidity of the surrounding atmosphere and (b) when developed with polar solvents, "dirt zones" can be seen at the position of the solvent front. Whereas for most qualitative analyses plates are typically used "out of the box" without any pretreatment, it is important to consider a standardized cleaning procedure if the analytical method has to be validated (stability test, quantification) and reproducible results are required. The activity of the plate affects the R_f value of the analyte. The higher the activity, the lower the R_f. Heating the plate to 120°C increases its activity. At that temperature adsorbed water is removed from the surface of the silica gel. High activity is not necessarily desirable, because it can cause tailing. Technically it is rather difficult to maintain a specific activity of the silica gel for chromatography. It can be done, though, by conditioning the plate prior to development, over sulfuric acid for an extended period of time (Fig. 3). A TLC system (layer and developing solvent) is more sensitive to changes in relative humidity the less polar the developing system is. Therefore, it is recommended to

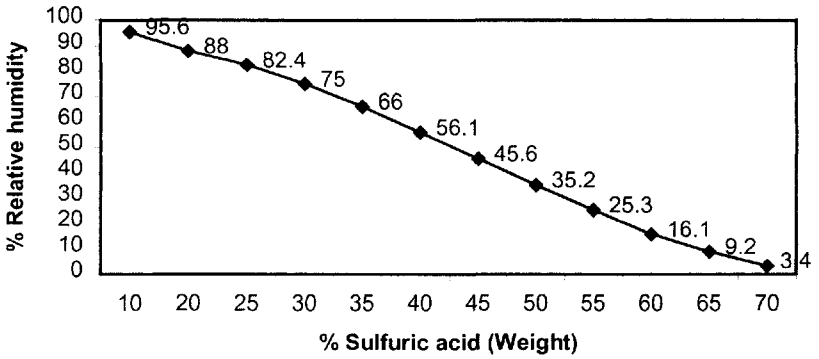

Figure 3 Relative humidity as a function of the concentration of sulfuric acid at 20°C. (Adapted from Ref. 50.)