Abstract: Thin layer chromatography (TLC) has a long tradition of being used as a simple, inexpensive, and flexible tool for rapid identification of complex mixtures. Many students of science have been introduced to the principles of separation science by some form of it. Nowadays most people would probably associate "real" chromatographic work with either High Performance Liquid Chromatography (HPLC) or Gas Chromatography (GC), while TLC is viewed as out dated.

High Performance TLC (HPTLC) is today's approach to planar chromatography which in many aspects can be seen as orthogonal to separation in a column/capillary. Resting on the foundation of well-established science HPTLC is a modern concept including the use of software controlled instrumentation, a rigorously standardized methodology, and validated methods. In contrast to its classical form, HPTLC offers highly reproducible information in the form of electronic images, which make the visual or software aided comparison of multiple samples a very easy task. HPTLC analysis of herbal materials can provide pictures, called fingerprints, which are complementary to HPLC data and thus provide another window for looking at the same sample with different separation principles and detection modes.

Traditionally classical TLC is described in all monographs for herbal drugs found in the European Pharmacopoeia as a method of identification. If replaced by HPTLC methods, which are fine-tuned to bring out similarities and differences between samples, proper identification of raw material and finished products is a simple task. Within about 30 minutes up to 20 samples can be analyzed in parallel. Specific HPTLC fingerprints are not only suitable for reliable identification of a given sample but also enable detection of adulteration with other, similar species or with chemical substances such as colorants and active pharmaceutical ingredients. Fingerprints may also be useful to establish quality specifications beyond assays of markers to help trace origins, compare multiple batches, or evaluate stability and shelf life. HPTLC can therefore be valued as a powerful tool for quality control particularly in the context of cGMPs.

Due to the planar separation principle all samples and their separated components remain static on the HPTLC plate once chromatography is finished. This opens the door for various and multiple detection modes, of which capturing images under UV and/or white light with and/or without chemical derivatization is only one. Classical scanning densitometry or image based video densitometry enable quantitative evaluation of separated compounds. The combination with bio assays (effect directed analysis) can help identify the presence of biologically active substances in herbal medicines. With commercially available interfaces even mass spectrometric identification of compounds on the HPTLC plate is possible.