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Overpressured Layer Chromatography

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I. INTRODUCTION

A. History of Overpressured Layer Chromatography* and Its Place Among Liquid Chromatographic Techniques

Conventional planar and nonplanar as well as thin- and thick-layer liquid chromatographic techniques require few instruments and are rather simple. Among the planar layer liquid chromatographic techniques, paper chromatography (PC) and its various versions developed in the 1940s by Martin and Synge (1) have to be mentioned first. Thin-layer chromatography (TLC), discovered by Ismailov and Shraiber (2) as well as Békésy (3), improved by Kirchner et al. (4), and standardized and spread by Stahl et al. (5,6), contributed to the isolation and analysis of many natural and synthetic substances. Today, versions of this classical chromatographic technique are indispensable in various fields of scientific research and practice.

The combination of flame ionization detection (FID) and TLC (TLC/FID) as a nonplanar layer chromatographic technique gives quantitative results without the need to use detection reagents. In this system the thin sorbent layer is, e.g., on a glass rod (open or turned-out column) (7).

Column and layer liquid chromatographic techniques—as supplementary techniques due to their arrangements—have always been characteristically developed in constant mutual interaction. Hence it is not surprising that the intensive development of high-performance column liquid chromatography (HPLC) entailed the need for the fundamental renewal of the most popular planar layer liquid chromatographic technique, TLC. In light of this, it can also be understood that the latest efforts aimed at further development of layer liquid chromatography are characterized by the desire to introduce sophisticated instrumental techniques similar to those of HPLC (8–10).

Attempts to develop an ultramicro (UM) chamber were first made in the 1960s (11). In this simple chamber, the chromatographic plate is covered by a glass plate in such a way that the end of the cover plate is not immersed in the solvent. This chamber is well suited for modeling classical column chromatographic (CC) separation. Important new instruments were developed

* Sometimes referred to as optimum performance laminar chromatography, for which the same abbreviation (OPLC) is used.