Simple scraper for thin-layer chromatograms

SÖREN BJÖRKERUD

Departments of Histology and Medicine I, University of Gothenburg, 400 33 Gothenburg, Sweden

SUMMARY A simple scraper for rapid and quantitative transfer of zones on thin-layer chromatograms to liquid scintillation counting vials is described.

SUPPLEMENTARY KEY WORDS scintillation counting

FOR QUANTITATIVE evaluation of thin-layer chromatograms isolation of the zone of silicic acid containing each component is often necessary. This can be accomplished by manual scraping with a piece of X-ray film or with a razor blade or with the help of zonal scrapers (1, 2). Isolation by hand is time-consuming and may result in loss of material. Zonal scanning requires equipment which may be inaccessible for many laboratories. The simple device described below is inexpensive, reduces by half the time required for scraping, and can be made with a minimum of technical skill.

The gasket was removed from the cap of a scintillation counting vial (Packard) and a hole with a diameter of 11.5 mm was drilled in the cap (Fig. 1, *A*). The screw-cap was cleaned thoroughly and a ribbon of tape was wound around the side of the cap to give a 10 mm rim above its upper surface. Araldite glue was then poured onto the upper surface of the cap to form a concave upper surface with the hole in the center. After the glue had hardened, the tape was removed. A piece of stainless steel wire, with a diameter of 0.5 mm, was bent to form a "bridge" that would fit into the hole of the cap (Fig. 1, *C*). The remaining parts of the wire were bent as shown in Fig. 1, *C*. In the gasket of the counting vial, a hole was punched with a diameter slightly larger than that in the cap (Fig. 1, *B*). The wire was inserted into the cap and glued between the gasket and the cap under pressure obtained by screwing the device on a counting vial (Fig. 1, *E*). A piece of X-ray film served as an edge for scraping (Fig. 1, *D*).

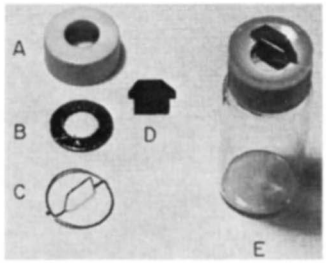

FIG. 1. Scraper for the isolation of zones on thin-layer plates. The constituent parts are a perforated screw-cap (*A*) and gasket (*B*) for liquid scintillation counting vials, a piece of stainless steel wire (*C*), and a piece of X-ray film (*D*). The assembled scraper is screwed onto a counting vial (*E*).

For the isolation of thin-layer zones, the plates were placed with the silicic acid layer facing downward on the support shown in Fig. 2. During scraping, the bulk of the silicic acid slides down the X-ray film piece into the counting vial connected to the scraper. Silicic acid remaining on the concave surface of the scraper and on the film falls into the vial when the vial is gently tapped.

The recovery was tested as follows. A mixture of ^{14}C-labeled lipids was obtained by in vivo incorporation of palmitate-U-^{14}C into mouse liver. The liver lipids were extracted with chloroform–methanol 2:1 and the extract was washed twice according to Folch, Lees, and Sloane Stanley (3). 10 aliquots were chromatographed on two silicic acid plates for the fractionation of neutral lipids (4) and 10 aliquots on two "basic" plates for the separation of phospholipids (5). After development, the following zones of each aliquot were scraped into different counting vials. These zones represented, for the "neutral lipid" separation: phospholipids, cholesterol and (or) diglycerides, free fatty acids (two zones), triglycerides, unidentified lipid material, cholesteryl esters, and the front; and for the "phospholipid" separation: the origin, lysolecithin, sphingomyelin, lecithin, phosphatidyl inositol, phosphatidyl ethanolamine, and neu-

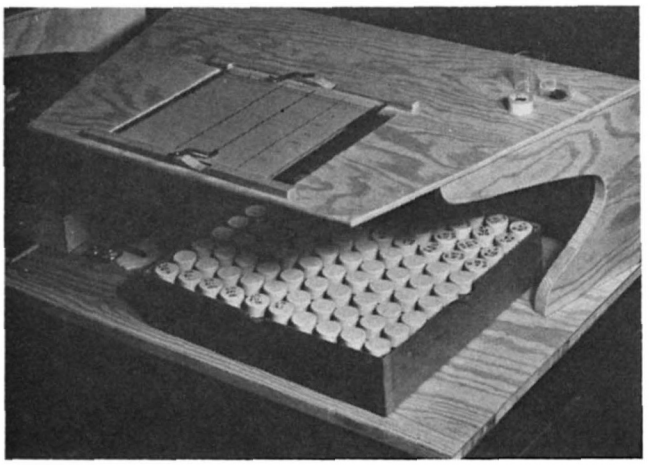

FIG. 2. Support for the thin-layer plates during scraping. The silicic acid layer is facing downward.

tral lipids. The X-ray film was replaced and the stopper wiped off after the isolation of each row of spots. The radioactivity of each sample and of five unfractoinated aliquots, each suspended in 10 ml of a scintillation mixture containing 4% Cab-O-Sil and 0.5% 2-(4′-*t*-butylphenyl)-5-(4′′-biphenylyl)-1,3,4-oxdiazole (Ciba, Basel), was measured in a Packard Tri-Carb liquid scintillation spectrometer. Quenching was corrected for by external standardization. The recovery was 101.4 ± 1.5% (±SD) after separation of neutral lipids and 102.7 ± 2.7% after separation of phospholipids.

This work was supported by the Swedish Medical Research Council (Project No. B69-19X-2589-01).

Manuscript received 5 February 1969; accepted 7 March 1969.

REFERENCES

1. Snyder, F. 1964. *Anal. Biochem.* **9:** 183.
2. Snyder, F., and H. Kimble. 1965. *Anal. Biochem.* **11:** 510.
3. Folch, J., M. Lees, and G. H. Sloane Stanley. 1957. *J. Biol. Chem.* **226:** 497.
4. Gloster, J., and R. F. Fletcher. 1966. *Clin. Chim. Acta.* **13:** 235.
5. Skipski, V. P., R. F. Peterson, J. Sanders, and M. Barclay. 1963. *J. Lipid Res.* **4:** 227.