Journal of Chromatography, 147 (1978) 429–431

CHROM. 10,387

Note

Positive pressure streaker with disposable pipette for thin-layer chromatography

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(Received May 16th, 1977)

Preparative thin-layer chromatography (TLC) is more convenient than conventional column chromatography when relatively small amounts of material have to be isolated from complex mixtures. This method requires application of a sample in a band, or streaker along the starting line of the chromatograms. The usual capillary pipette is not suitable for this purpose since it disturbs the surface of the thin layer, causing uneven solvent flow and resulting in unsatisfactory separation. There are a number of devices available for streaking thin-layer chromatograms[1–10]. Some are commercially available, but are rather expensive and have a disadvantage of contamination. Recently the use of a disposable streaking applicator for TLC has been reported[11]; however, there is a drawback because, owing to the lack of positive pressure in the system, aqueous solutions do not start to flow easily when the tip touches the absorbant layer. In this paper, we describe a positive pressure streaker with disposable pipette for TLC.

EXPERIMENTAL

The device can be constructed easily from materials generally found in a chemistry laboratory as rubber stopper, Tygon tubing, glass rod, metal clamp, rubber bulb, stopcock, and springs. Fig. 1 shows the main streaking apparatus. Part A made of No. 11½ rubber stopper served as a roller which is fixed to the screw of part B, the metal clamp. There is a glass rod inserted to serve as pushing rod. Part C, a rubber bulb with open end inserted with a glass tubing, is fixed in a wooden housing with silicon rubber. Part D is a three-way glass stopcock and part E is a fabricated disposable capillary pipette which is held down by two springs onto two fabricated glass rods. A polyethylene capillary tubing (0.6 mm I.D.) was hooked up to the end of the pipette. Parts B, C, D and two fabricated glass rods were permanently glued to the base plate. Tygon tubings were used to connect parts C and D, and D and E.

For streaking, a larger wooden board with elevated guides is needed (Fig. 2). For filling the sample, the three-way glass stopcock is closed, then a roller is turned clockwise until the rubber bulb is pressed to a certain extent depending on the amount of sample for each filling. The tip of the polyethylene capillary tube is then dipped into the sample solution and the roller is then turned counter clockwise to fill the pipette with the sample solution. The apparatus is at rest on the application board

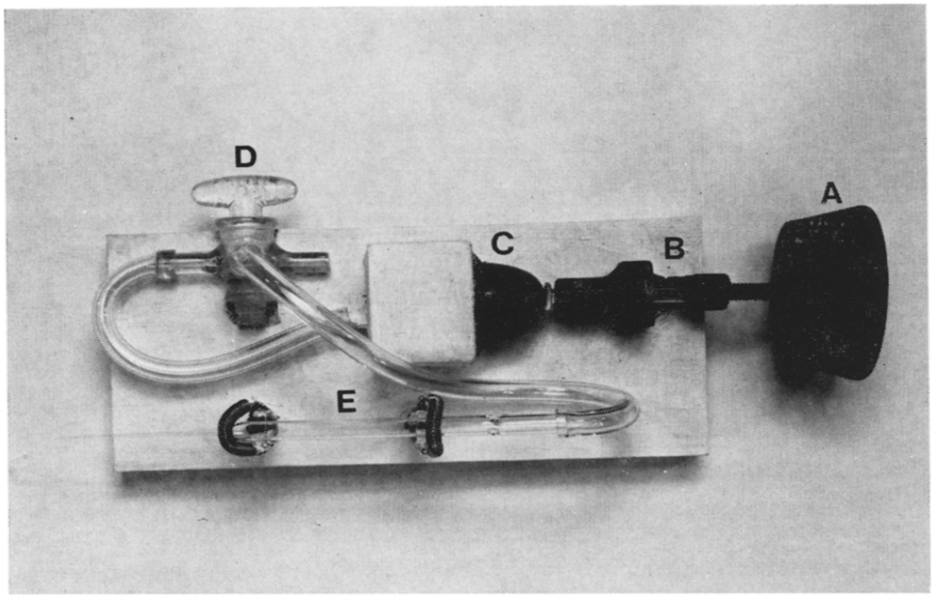

Fig. 1. Photograph of the TLC streaker. A, roller; B, glass rod pusher; C, rubber bulb; D, three-way glass stopcock; E, disposable pipette with polyethylene capillary tip.

with the roller sit on the elevated guide. A TLC plate is positioned in the center of the board. The starting line can be adjusted by sliding and rolling the capillary pipette until the tip contacts the TLC plate. By sliding the apparatus away from the operator, a stream of sample can then be delivered on to the TLC plate. The procedure can be repeated on the same TLC plate for application of large volume of solution.

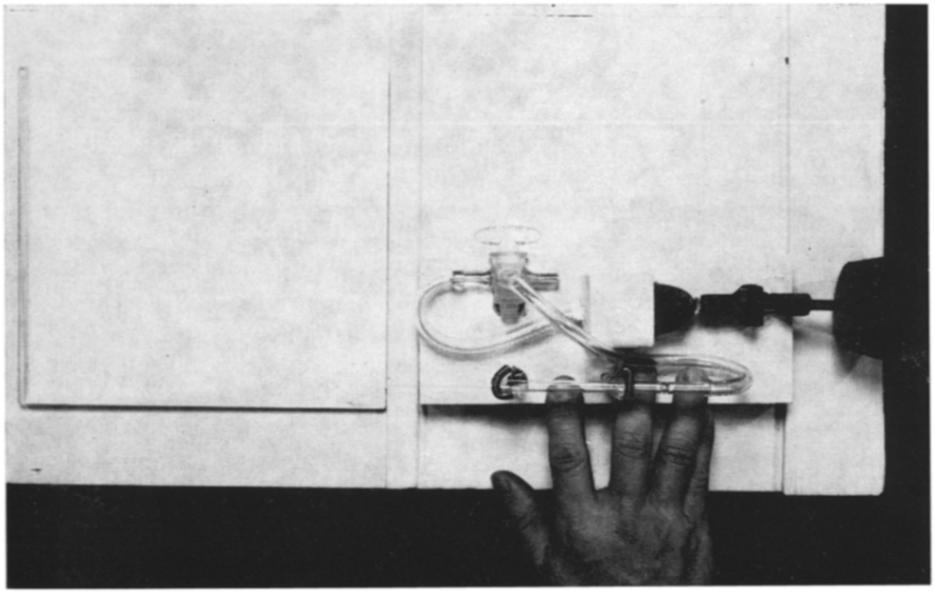

Fig. 2. Streaking on TLC plate.

RESULTS

With positive pressure in the system during operation, this device can deliver either aqueous or non-aqueous sample in a continuous way. The rate of flow can be adjusted by using rollers of different diameters. For quantitative analysis, capillary pipette can be replaced by volumetric micropipette.

ACKNOWLEDGEMENTS

This investigation was supported by Grant FD-00683-03 from the Office of Research Grants, Food and Drug Administration.

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