

Attached are comments on the 3M Technical Report "Soil Thin Layer Chromatography - FC95, FC143, FM3422. A. Mendel, Project No. 997061200 3M Technical Notebook No. 48277, Page 30, Oct. 13, 1978 (one page from a technical notebook)" made by Professor Stephen A. Boyd, Michigan State University, dated May 19, 1993.

Review of Technical Notebook No. 48277-30
Soil Thin Layer Chromatography

I am not too sure how useful these plates are. Apparently both FC 143 and FM 3422 remained at the origin of the thin layer plate where they were originally spotted. This implies no movement with the water used to develop the plate. Basically this tells me the method is insensitive, and doesn't yield much useful information. That is because FM 143 has a much lower soil sorption coefficient ($K_{oc} = 17$) than FM 3422 ($K_{oc} = 15,000$) and yet they behaved similarly in the soil thin layer chromatography plate.

Mobility studies are probably best done in soil columns using miscible displacement experiments. These are more difficult to do experimentally but would yield more useful data that could be compared to other well studied compounds. The experimental approach is well established now and there are several laboratories doing this type of work, including my own. These experiments augment batch equilibration (isotherm) experiments very nicely.

SUBJECT NO. 9970612600

3M TECHNICAL NOTEBOOK NO. 48277 30

Subject:

Date: 10-13-78

SOIL THIN-LAYER CHROMATOGRAPHY - FC95, FC143, FM3422

Object: TO COAT GLASS PLATES WITH SOIL FOR STUDIES

See also A. Mendel - Tech Report - 1/17/79

Reference: 42554-72

VARIOUS SOILS WERE SIEVED EARLIER BY M.T. ELNABBARAWY AND IT WAS FOUND EMPIRICALLY THAT THE 250 MICRON SIZE SOIL PARTICLES WHEN SLURRIED WITH WATER AND COATED ON GLASS PLATES GAVE GOOD OVERALL PLATES. ACCORDINGLY THE FOLLOWING WAS DONE.

AN INTIMATE MIXTURE OF 150 g. OF 250 MICRON-SIEVED GREEN-HOUSE SOIL [OBTAINED FROM W. BERG, AGRICHEM AND SOIL SIEVED BY M.T.E. AND L.H. PRITCHARD] AND 80 ML. WATER WAS WELL-SHAKEN AND SPREAD ONTO TEN 10x20 CM. GLASS PLATES [NEXT TIME TRY USING 85-90 ML. WATER TO MAKE MIXTURE SLIGHTLY LESS VISCOUS AND SPREADING MAY BE SLIGHTLY QUICKER]. THE PLATES WERE ALLOWED TO AIR DRY. THE SPREADER USED TO COAT THE PLATES WAS DESIGNED BY DR. J.W. BEUSLE, G. BUTHRIE (MACHINE SHOP-201) AND A. MENDEL

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ONE OF THE 10x20 CM PLATES WAS SPOTTED 2 CM FROM THE BOTTOM WITH RADIO LABELED FC 95 (LEFT SIDE), FC 143 (MIDDLE) AND FM 3422 (RIGHT SIDE, AS ONE VIEWS PLATE). SPOTS WERE APPLIED BY CONNIE SCHRAMDT. THE PLATE WAS DEVELOPED 100 MM. IN A FILTER PAPER [WHATMAN NO. 1] - LINED TANK PRESATURATED [OVER 1 DAY] WITH WATER. THE DEVELOPMENT REQUIRED ABOUT 1 HR 40 MIN. THE PLATE WAS AIR DRIED. IT WAS NOTED THAT WHEN THE SOIL TLC PLATE WAS PLACED INTO THE TANK CONTAINING ABOUT 1 CM DEEP WATER, THE SOIL IN THE WATER GRADUALLY FELL FROM THE PLATE BUT THIS DID NOT SEEM TO AFFECT THE DEVELOPMENT PROCESS.

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THE PLATE WAS PLACED ON X-RAY FILM (AGRICHEM FACILITIES) AND EXPOSED FOR 10 DAYS (TEN). THE DEVELOPED PLATE (KINDLY DEVELOPED BY LARRY STEIFCH, AGRICHEM) SHOWED THAT FC 143 AND FM 3422 DID NOT LEAVE ORIGIN. THE SPOT DUE TO FC 95 WAS TOO FAINT FOR VISUALIZATION. THE LOW RADIOACTIVITY OF THE COMPOUNDS REQUIRE HIGHER CONCENTRATION OF SPOTTING (i.e. MORE SAMPLE).

11/6/78

Signature

A. Mendel

Date:

Nov 13, 1978

Read and Understood

Date:

11/14/78