

Mangold H K & Malins D C. Fractionation of fats, oils, and waxes on thin layers of silicic acid. *J. Amer. Oil Chem. Soc.* 37:383-5, 1960.
[Univ. Minnesota, Hormel Inst., Austin, MN and Technological Lab., Bureau of Commercial Fisheries, US Fish and Wildlife Serv., Seattle, WA]

The fractionation of lipids by thin-layer chromatography (TLC) is described. Adsorption chromatography on thin layers of silicic acid permits the rapid resolution of complex lipid mixtures into classes of compounds ranging in polarity from hydrocarbons to phospholipids. [The *SCI*[®] indicates that this paper has been cited over 260 times since 1961.]

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"In September 1958, the US Public Health Service, National Institutes of Health (NIH), informed me that my application for a research grant had been approved for a period of three years. The grant for work on the 'Isolation of unusual lipids...' covered my salary and included a few hundred dollars a year for equipment, glassware, and chemicals. With this starting capital I purchased the equipment E. Stahl had developed for the coating of glass plates with a thin layer of an adsorbent.

"The first publication I credited to my NIH grant described the use of adsorption-TLC for the fractionation of radioactively labeled lipid derivatives into classes of compounds having the same type and number of functional groups, and the further resolution of each of these lipid classes by reversed-phase paper chromatography.¹

"Early in 1959, I began cooperating with Donald C. Malins, a guest who had spent several months at our institute. We agreed to try the fractionation of complex natural lipid mixtures, such as vegetable oils and animal fats and oils. Our enthusiasm grew day by day as we recognized that TLC on

silicic acid allowed us to distinguish olive oil, essentially a mixture of triacylglycerols, from jojoba oil, which consists of a mixture of wax esters. Even more surprising and impressive was the resolution of such structurally related lipids as the triacylglycerols and alkyldiacylglycerols of shark liver oils.

"In the fall of 1959, we submitted our first manuscript to a journal, but it was rejected. We sent the manuscript to another journal, which didn't want it either. Well, eventually, the editor of the *Journal of the American Oil Chemists' Society* accepted our manuscript for publication, and we sent him a few more papers.

"The response to our publications was enormous. The TLC technique caught on like wildfire, not only in the lipid field, but also in other areas of natural products chemistry and in biochemistry. In 1960 we reported on our work at the meeting of the American Oil Chemists' Society in New York City, and we won the Bond Award. An invitation to the Gordon Conference on Lipid Metabolism and numerous invitations by universities and professional societies followed. I became a consultant to the Oak Ridge Institute of Nuclear Studies, Oak Ridge, Tennessee, an appointment I cherished for over ten years.

"My NIH grant was renewed year after year. I received additional support, and when I left the University of Minnesota in 1969, I 'bequeathed' to my successors two postdoctoral positions that were financed by the NIH. At Münster, I continued work on unusual lipids, such as ether lipids,² pheromones, and cyclopentenyl fatty acids,³ and I investigated the lipids in plant cell cultures.⁴ In 1977 I won the Heinrich Wieland Prize for studies on the synthesis and biosynthesis of alkoxy lipids.²

"I am sure my friend Malins will agree with me that our paper has been quoted so frequently because it was the first to describe the fractionation of natural fats and oils and waxes, and not of model mixtures of synthetic lipid compounds. We had made a point of developing a procedure for the analysis of 'greases,' something hardly anybody wanted to deal with. It worked, and it still does!"⁵

1. Mangold H K. Zur Analyse von Lipiden mit Hilfe der Radioreagenz-Methode. *Fette Seifen Anstrichm.* 61:877-81, 1959.
2. ----- Synthesis and biosynthesis of alkoxy lipids. *Angew. Chem. Int. Ed.* 18:493-503, 1979.
3. Mangold H K & Spener F. The cyclopentenyl fatty acids. (Tevini M & Lichtenhaler H K, eds.) *Lipids and lipid polymers in higher plants.* Berlin: Springer-Verlag, 1977. p. 85-101.
4. Radwan S S & Mangold H K. Biochemistry of lipids in plant cell cultures. (Fiechter A, ed.) *Advances in biochemical engineering.* Berlin: Springer-Verlag, 1980. Vol. 16. p. 109-33.
5. Mangold H K & Mukherjee K D. New methods of quantitation in thin-layer chromatography: tubular thin-layer chromatography. *J. Chromatogr. Sci.* 13:398-402, 1975.