View metadata, citation and similar papers at core.ac.uk

July 1973

brought to you by T CORE

D/3-102/1

NASA TECH BRIEF Ames Research Center



NASA Tech Briefs announce new technology derived from the U.S. space program. They are issued to encourage commercial application. Tech Briefs are available on a subscription basis from the National Technical Information Service, Springfield, Virginia 22151. Requests for individual copies or questions relating to the Tech Brief program may be directed to the Technology Utilization Office, NASA, Code KT, Washington, D.C. 20546.

"Dry-Column" Chromatography of Plant Pigments

The primary differences between dry-column chromatography and conventional wet column chromatography are that the solid adsorbent is placed in the column without the aid of a solvent and that the development of the column is normally terminated when the solvent front has just reached the bottom of the column. More important, however, is that a dry-column procedure can be derived directly from the results of preliminary experiments with the techniques of thin-layer chromatography.

It has been found that the separation of plant pigments which can be accomplished on thin-layer silica plates with a mixture of petroleum ether, a halocarbon, acetone, and a polar solvent can be readily translated into a dry-column technique that yields reproducible chromatograms after elution in the fashion of liquid chromatography with a fluorimeter as a detector. The best solvent system, which provides clean separations and does not produce doublebanding in silica-packed columns, was found to be a mixture of 22 parts by volume of petroleum ether $(30-60^{\circ})$, 3 parts dichloromethane, 3 parts acetone, and 2 parts ethyl acetate.

A satisfactory sorption column for analytical separation of plant pigments contains 160 mm of silica gel (4.5 grams) drawn by suction into a 7.8-mm (I.D.) stainless steel tube, and the silica gel is held firmly packed and in position against a 180-mesh screen disc by a spring pressing on another screen located in the top fitting of the column. A vessel containing the elution fluid under helium pressure is connected to the top of the analytical column; a short link of 0.5mm I.D. (20-mil) polytetrafluoroethylene tubing is used to join the bottom of the analytical column to the bottom of a fluorimeter flow cell. The flow cell is a 3-mm I.D. quartz tube with ends of reduced diameter; it has an active volume of 100 micrometers, and is appropriately mounted in a fluorimeter. The top of the fluorimeter cell is attached by tubing to another pressure vessel that is connected to a packed column; the combination acts as a suppressor stage and prevents formation of gas bubbles in the fluorimeter cell.

The analytical column is conditioned or regenerated by passing through anhydrous acetone followed by acetone with 7% water, and finally drying with a stream of helium. Samples contained in 10 to 50 microliters of a nonpolar solvent such as petroleum ether are deposited on the top screen of the analytical column. Then, the elution solvent is allowed to enter the column; gradually, helium pressure is applied to cause a flow of about 20 ml per hour and the fluorimeter detector is set to record the elution chromatogram.

Note:

Requests for further information may be directed to:

Technology Utilization Officer Ames Research Center Moffett Field, California 94035 Reference: B73-10271

Patent status:

NASA has decided not to apply for a patent.

Source: Fritz H. Woeller, Marjorie E. Lehwalt, and Vance I. Oyama Ames Research Center (ARC-10780)

Category 04

This document was prepared under the sponsorship of the National Aeronautics and Space Administration. Neither the United States Government nor any person acting on behalf of the United States Government assumes any liability resulting from the use of the information contained in this document, or warrants that such use will be free from privately owned rights.