Waters Lab Highlights

An Internal Communication of Applications and Techniques

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WATER QUALITY

I: CHLOROPHYLL IN FRESH WATER USING A μBONDAPAK™ C_{18} CARTRIDGE

The measurement of the number and type of microorganisms in fresh water is used as a measure of water quality.

If inorganic or organic nutrients are present in streams and lakes, algae can grow. If the growth of these organisms is excessive, the supply of oxygen is depleted, producing anaerobic conditions which produce the foul odors associated with "stagnant" water and the death of higher animals by oxygen depletion. As an instance of this, there has been concern over pockets of anaerobic conditions in the great lakes of North America, suspected to be due to increased algal growth encouraged by an excess of fertilizer run-off.

Algal "blooms" in fresh water can also produce off-odors which, although not dangerous to health, result in justifiable complaints from consumers.

One method of measuring the number of algae is to filter them from the water and count them microscopically. An alternative to counting the algae is to extract the filter with a solvent and measure the amount of chlorophyll extracted from the algae with a spectrophotometer. These procedures are described in Millipore brochures "Application Procedure" Nos. 305 and AB 310.

Waters applications laboratories in England and Holland have devised an LC procedure for measuring this chlorophyll. The procedure is similar to the spectrophotometric method except that a 50 microliter aliquot of the solvent extract is injected into an LC. The eluent is monitored at 436 nm and 658 nm to detect chlorophyll A as shown in Figure 1.

The procedure is rapid and not subject to the errors obtained by the spectrophotometric method, as it is specific for chlorophyll A. The LC method could also be scaled down to save time and reagents. The LC method was developed on a Radial-PAK™ μBONDAPAK™ C_{18} cartridge and is suited for use on the QA-1 for routine analysis.

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Detector: M440 at 436 and 658 nm
Column: Radial-PAK™ μBONDAPAK™ C_{18} cartridge
Mobile Phase: 100% methanol
Flow Rate: 2 ml/min

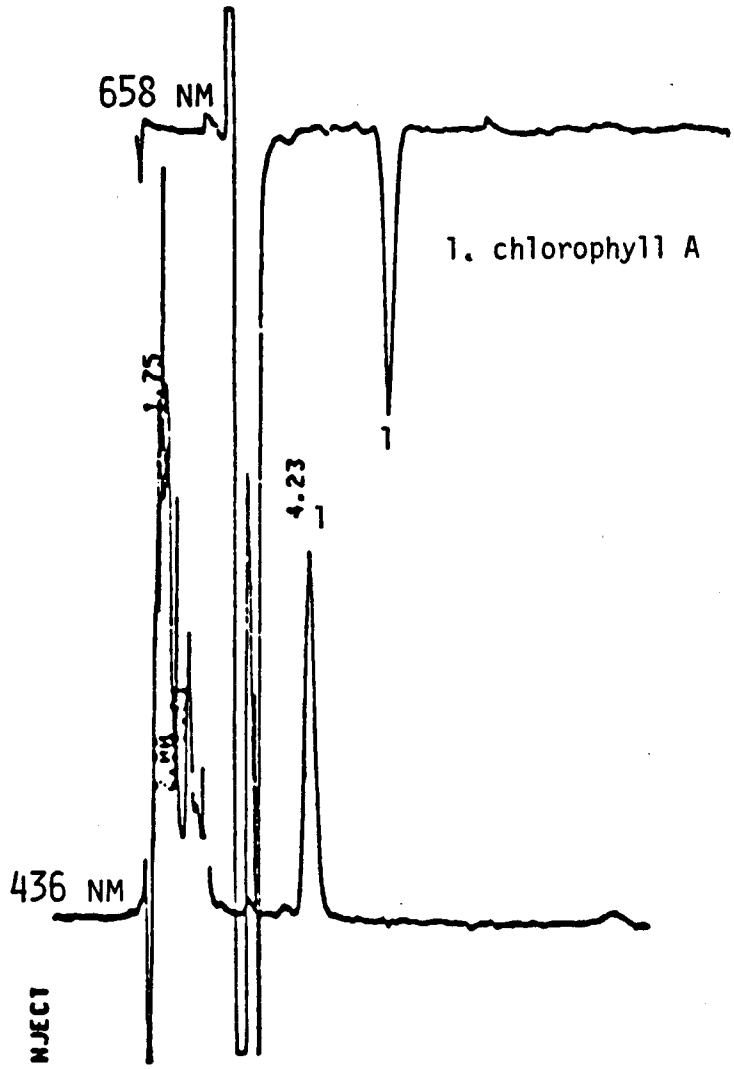

FIGURE 1: 50μl INJECTION OF ETHANOL EXTRACT FROM 1 LITER OF WATER