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A Method of Isolating Organic Compounds Present in Water

An absorption method of isolating organic compounds present in water at the sub part per million concentration level has been developed. The water sample is passed through a column containing a commercially available macroreticular resin, which essentially absorbs only nonionic organic compounds. These organic compounds can then be selectively separated using aqueous eluents of varying pH, or completely exuded with a small amount of an organic eluent.

Specifically, an appropriate quantity of water (20-2000 liters) is passed over a 15 cm long x 1 cm diameter column of resin at a moderate flow rate (5-50 ml/min). The column is then sequentially eluted with dilute strong acid (~0.05 M HCl), dilute weak base (~0.05 M NaHCO₃), and dilute strong base (~0.05 M NaOH) in order to remove the organic bases, carboxylic acids and phenols, respectively. Finally, the column is eluted with an organic solvent, such as ether, pentane or methanol, to exude the remaining neutral organic compounds. The pH of the aqueous fractions is adjusted so that the compounds are in molecular rather than ionic form. The fractions are then absorbed on a column of the resin and stripped off with a suitable organic solvent. The organic compounds are now concentrated and identified using established analytical techniques.

This method has been used successfully to isolate several organic compounds including carboxylic acids, phenols, ketones, alcohols, and hydrocarbons. Tests on several model compounds have shown that retention is essentially quantitative at the part per million concentration level.

The method is simple, inexpensive, and adaptable to laboratory, industrial, and in the field operations. It possesses utility both as an analytical and purification tool.

This method will be of interest to organic chemists, biochemists, governmental pollution control agencies, and industries combating water pollution.

Note:

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Patent status:

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