

BIOMOC

Model Uses BIOMOC is a physical model that simulates the 2-Dimensional transport of solutes through a water system as well as biodegradation rates and microbial growth.

Major Categories Water Quality

Subject Knowledge Level
Intermediate

Minor Categories Nutrient Production; Transport

Technical Difficulty Level
Intermediate

Model Type Physical Model

Geographic in Nature?
No

Abstract

BIOMOC is a two-dimensional model that can simulate the transport and biotransformation of multiple reacting solutes. The program is general and flexible, allowing for any combination of biodegradation processes. A number of expressions for biological transformation rates have also been included as options in the program. These include single, multiple, and minimum Monod kinetics and competitive, noncompetitive, and Haldane inhibition. The kinetic parameters can be formulated to simulate zero-order or first-order approximations of biodegradation rates. The growth and decay of several microbial populations performing the transformations is also accounted for. The microbial growth can be disabled, limited by biomass inhibition, or limited by the availability of a specified nutrient.

Future Developments

Unknown

Model Limitations

Unknown

Model Features

- Generate or reposition particles;
- Compute hydraulic gradients, velocities, dispersion equation coefficients, and time increment for stable solution of transport equation;
- Compute change in chemical concentrations and mass balance for transport model;
- Compute nonlinear retardation factor and correction term for decay of absorbed solute;
- Compute absorbed concentration corresponding to concentration in solution;
- Compute biodegradation terms using multiple Monod formulation;
- Compute biodegradation terms using minimum Monod formulation.

Required Data Types

Input data consist of initial conditions, boundary conditions, aquifer properties, and biodegradation parameters.

Model Outputs

BIOMOC returns general input information; flow velocities; concentrations of all solutes and microbes; and time history of concentrations.

See documentation for details.

Hardware Requirements

UNIX or DOS - 386 or later with Math-Coprocessor.

		Supported Platforms	
DOS	<input checked="" type="checkbox"/>	UNIX	<input checked="" type="checkbox"/>
Windows	<input type="checkbox"/>	Macintosh	<input type="checkbox"/>

Software Requirements

None Required.

Cost, Licensing and Availability

Model is offered free of charge from link provided.

Source

USGS

Source (URL)

<http://water.usgs.gov/software/biomoc.html>