$$b\frac{\partial c}{\partial t} = \nabla \cdot (D\nabla c) - \nabla \cdot (\overrightarrow{v} c)$$

$$b\frac{\partial c}{\partial t} = \frac{D\frac{\partial c}{\partial x}}{\partial x} + \frac{D\frac{\partial c}{\partial x}}{\partial y} - \frac{v_x c}{\partial x} - \frac{v_y c}{\partial y}$$

FDM

$$b\frac{\partial c}{\partial t} = D\frac{c_{i+1,j} - 2c_{i,j} + c_{i-1,j}}{\Delta x^2} + D\frac{c_{i,j+1} - 2c_{i,j} + c_{i,j-1}}{\Delta y^2} - v_x\frac{c_{i+1,j} - c_{i-1,j}}{2\Delta x} - v_y\frac{c_{i,j+1} - c_{i,j-1}}{2\Delta y}$$

FDM + implicit euler

$$b\frac{c_{i,j,t+1} - c_{i,j,t}}{\Delta t} = D\frac{c_{i+1,j,t+1} - 2c_{i,j,t+1} + c_{i-1,j,t+1}}{\Delta x^2} + D\frac{c_{i,j+1,t+1} - 2c_{i,j,t+1} + c_{i,j-1,t+1}}{\Delta y^2} - \\ - v_x\frac{c_{i+1,j,t+1} - c_{i-1,j,t+1}}{2\Delta x} - v_y\frac{c_{i,j+1,t+1} - c_{i,j-1,t+1}}{2\Delta y} \quad (1)$$

$$b\frac{c_{i,j,t+1}}{\Delta t} - b\frac{c_{i,j,t}}{\Delta t} = D\frac{c_{i+1,j,t+1}}{\Delta x^2} - 2D\frac{c_{i,j,t+1}}{\Delta x^2} + D\frac{c_{i-1,j,t+1}}{\Delta x^2} + D\frac{c_{i,j+1,t+1}}{\Delta y^2} - 2D\frac{c_{i,j,t+1}}{\Delta y^2} + D\frac{c_{i,j-1,t+1}}{\Delta y^2} - \\ - v_x\frac{c_{i+1,j,t+1}}{2\Delta x} + v_x\frac{c_{i-1,j,t+1}}{2\Delta x} - v_y\frac{c_{i,j+1,t+1}}{2\Delta y} + v_y\frac{c_{i,j-1,t+1}}{2\Delta y} \quad (2)$$

$$- D\frac{c_{i+1,j,t+1}}{\Delta x^2} + v_x\frac{c_{i+1,j,t+1}}{2\Delta x} - D\frac{c_{i,j+1,t+1}}{\Delta y^2} + v_y\frac{c_{i,j+1,t+1}}{2\Delta y} + b\frac{c_{i,j,t+1}}{\Delta t} + 2D\frac{c_{i,j,t+1}}{\Delta x^2} + 2D\frac{c_{i,j,t+1}}{\Delta y^2} - \\ - D\frac{c_{i-1,j,t+1}}{\Delta x^2} - v_x\frac{c_{i-1,j,t+1}}{2\Delta x} - D\frac{c_{i,j-1,t+1}}{\Delta y^2} - v_y\frac{c_{i,j-1,t+1}}{2\Delta y} = +b\frac{c_{i,j,t}}{\Delta t} \quad (3)$$

$$(-\frac{D_x}{\Delta x^2} + \frac{v_x}{2\Delta x})c_{i+1,j,t+1} + (-\frac{D_y}{\Delta y^2} + \frac{v_y}{2\Delta y})c_{i,j+1,t+1} + (\frac{b}{\Delta t} + \frac{2D_x}{\Delta x^2} + \frac{2D_y}{\Delta y^2})c_{i,j,t+1} + \\ + (-\frac{D_x}{\Delta x^2} - \frac{v_x}{2\Delta x})c_{i-1,j,t+1} + (-\frac{D_y}{\Delta y^2} - \frac{v_y}{2\Delta y})c_{i,j-1,t+1} = b\frac{c_{i,j,t}}{\Delta t} \quad (4)$$