Pesticide tissue residue for single trophic levels:

$$C_B = \frac{k_1 * (m_o * \phi * C_{wto} + m_p * C_{wdp}) + k_D * \sum(P_i C_{Di})}{k_2 + k_E + k_G + k_M}$$

parameters:

$k_1$ = pesticide uptake rate constant through respiratory area

$k_2$ = rate constant for elimination of the pesticide through the respiratory area

$k_D$ = pesticide uptake rate constant for uptake through ingestion of food

$k_E$ = rate constant for elimination of the pesticide through excretion of contaminated feces

$k_G$ = organism growth rate constant

$k_M$ = rate constant for pesticide metabolic transformation

$m_o$ = fraction of respiratory ventilation involving overlying water

$P_i$ = fraction of diet containing i (prey item)

$\phi$ = fraction of the overlying water concentration of the pesticide that is freely dissolved

Calculation of available pesticide fraction in water:

$$\phi = \frac{1}{1 + (X_{POC} * \alpha_{POC} * K_{OW}) + (X_{DOC} * \alpha_{DOC} * K_{OW})}$$

parameters:

$X_{POC}$ = concentration of particulate organic carbon in water

$X_{DOC}$ = concentration of dissolved organic carbon in water

$\alpha_{POC}$ = proportionality constant to describe the similiarity of phase partitioning of POC in relation to octanol

$\alpha_{DOC}$ = proportionality constant to describe the similiarity of phase partitioning of DOC in relation to octanol

Calculation of pesticide concentration in the solid portion of the sediment:

$$C_s = C_{SOC} * OC$$

where:

$$C_{SOC} = C_{WDP} * K_{OC}$$

parameters:

$C_{SOC}$ = normalized (for OC content) pesticide concentration in sediment

$C_{WDP}$ = freely dissolved pesticide concentration in pore water

$K_{OC}$ = organic carbon partition coefficient

$OC$ = percent organic carbon in sediment