Tier I Rice Model v1.0

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The Formula of the Tier I Rice Model v1.0:

$$C_w = \frac{m'_{ai}}{0.00105 + 0.00013K_d}$$

and, if appropriate:

$$K_d = 0.01K_{oc}$$

where:

C_w = water concentration [μg/L]
m'_{ai} = mass of active ingredient applied per unit area [kg/ha]
K_d = water-sediment partitioning coefficient [L/kg]
K_{oc} = organic carbon partitioning coefficient [L/kg]

The Tier I Rice Conceptual Model:

$$C_w = \frac{m_{ai}}{V_w + m_{sed}K_d} \tag{1}$$

where:

C_w = water concentration [mass/volume]
m_{ai} = mass of active ingredient applied to paddy [mass]
V_w = volume of water column plus pore water [volume]
m_{sed} = mass of sediment at equlibrium with water column [mass]
K_d = water-sediment partitioning coefficient [volume/mass]

It is more customary to describe a rice paddy in terms of depth rather than volume or mass. Therefore, the following equations are defined:

$$m_{sed} = d_{sed} A \rho_b \tag{2}$$

$$V_w = d_w A + d_{sed} \theta_{sed} A \tag{3}$$

where:

d_{sed} = sediment depth [length]
d_w = water column depth [length]
A = area of the rice paddy [area]
θ_{sed} = porosity of sediment [-]
ρ_b = bulk density of sediment [mass/volume]

$$m'_{ai} = \frac{m_{ai}}{A} \tag{4}$$

where:

m'_{ai} = mass applied per unit area [mass/area]

$$C_w = \frac{m'_{ai}}{d_w + d_{sed}(\theta_{sed} + \rho_b K_d)} \tag{5}$$

JUST FOR LEARNING: THIS IS T-REX

$$C_t = C_n e^{-kt} \tag{6}$$

or in natural log form:

$$\ln(C_t) = \ln(C_0) - kt \tag{7}$$