Verifikasi model matematis dan persamaan empiris perilaku pestisida organofosfor di tanah sawah hasil pengamatan laboratorium pada tanah sawah sebenarnya

---

Abstrak

The mathematical model was selected and the empirical equations were formulated from laboratory measurement by disturbed soil that was applied in undisturbed soil or field so required a correction factor. The correction factor could be expressed as a value of channeling fraction. The channeling process will affect to the average velocity of soil solution flow in soil. The average velocity of soil solution flows in soil controlled the fate of pesticide in undisturbed soil. The soil solution flows at undisturbed soil were expressed as two difference velocity values. The first part has equal velocity as its superficial velocity. The second part, because of chanelling, it was arbitrarily determined to be 10 times of the superficial velocity, and therefore, the superficial velocity of soil solution in the undisturbed soil must be corrected by the channeling fraction. The objective of the verification experiment was to identify a correction factor that could be expressed as channeling fraction in the equation as follows:
V undisturbed soil = (1-channeling fraction) V Superficial + chanelling fraction (10 x v superficial)
The verification was carried out at undisturbed soil obtained from three locations. The undisturbed soil in PVC pipe was saturated with water. After a saturated condition is reached, the flow direction of water was turned from top to bottom. The water continuously flows. After the steady state condition, water flow were substituted with the flow of fenitrothion solution, at the time was regarded as an initial condition (t=0). At the certain time the soil solutions at the outlet were taken to be determined the concentration of fenitrothion by HPLC. Based on the selected mathematical model and theempiricial equitations, the concentration of pesticide in soil solution as a position and time function can be calculated. The correction factor or the channeling fraction could be evaluated by comparing the fenitrothion concentration as a time function, from laboratory experiment data and from mathematical simulation result. The obtained channeling fraction values are 0.03, 0.05, and 0.1 for the clay loam-clay, the sandy loam-sand, and the loam-sandy loam textures, respectively.