Persistent organochlorine pesticides and polychlorinated biphenyls in some agricultural and industrial areas in Northern Vietnam

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Abstract: Organochlorine pesticide and polychlorinated biphenyl residues were determined in soils and surface sediments collected from Hanoi City, Vlettri City and Halong Bay, which are representative of industrial and agricultural areas in northern Vietnam. Polychlorinated biphenyls (PCBs) and organochlorine insecticides such as DDT and its metabolites (DDTs) and lindane were detected in all samples analyzed, indicating the widespread contamination by these compounds in the environment of the north of Vietnam. Concentrations of DDTs and lindane were found to be highest in sediments from Halong Bay, followed by those in Viettri and Hanoi. PCB residues ranged from 0.64 ng g^{-1} to 120 ng g^{-1} (dry weight basis) in sediments and these levels were generally higher than those in soil samples. In general, higher concentrations of pesticides and PCBs were recorded in Halong Bay, suggesting the local sources in this area, probably from mining activities. High accumulation of DDTs in soils, sediments and biota from north to south Vietnam indicates that the recent input of DDT is still occurring throughout the country.Organochlorine pesticide and polychlorinated biphenyl residues were determined in soils and surface sediments collected from Hanoi City, Viettri City and Halong Bay, which are representative of industrial and agricultural areas in northern Vietnam. Polychlorinated biphenyls (PCBs) and organochlorine insecticides such as DDT and its metabolites (DDTs) and lindane were detected in all samples analyzed, indicating the widespread contamination by these compounds in the environment of the north of Vietnam. Concentrations of DDTs and lindane were found to be highest in sediments from Halong Bay, followed by those in Viettri and Hanoi. PCB residues ranged from 0.64 ng g^{-1} to 120 ng g^{-1} (dry weight basis) in sediments and these levels were generally higher than those in soil samples. In general, higher concentrations of pesticides and PCBs were recorded in Halong Bay, suggesting the local sources in this area, probably from mining activities. High accumulation of DDTs in soils, sediments and biota from north to south Vietnam indicates that the recent input of DDT is still occurring throughout the country.

Author Keywords: Northern Vietnam; Organochlorine pesticides; Polychlorinated biphenyls; Sediments; Soils

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References:

1. Iwata, H., Tanabe, S., Sakai, N., Nishimura, A., Tatsukawa, R., Geographical distribution of persistent organochlorines in air, water and sediments from Asia and Oceania, and their implications for global redistribution from lower latitudes (1994) Environ. Pollut., 85, pp. 15-33
2. Kannan, K., Tanabe, S., Quynh, H.T., Hue, N.D., Tatsukawa, R., Residue pattern and dietary intake of persistent organochlorine compounds in foodstuffs from Vietnam (1992) Arch. Environ. Contam. Toxicol., 22, pp. 367-374
3. Nhan, D.D., Am, N.M., Hoi, N.C., Dieu, L.V., Carvanho, F.P., Villeneuve, J.P., Organochlorine pesticides and PCBs in the Red river delta, north Vietnam (1998) Mar. Pollut. Bull., 39, pp. 742-749
4. Nhan, D.D., Am, N.M., Carvalho, F.P., Villeneuve, J.P., Cattini, C., Organochlorine pesticides and PCBs along the coast of north Vietnam (1999) Sci. Total Environ., 237-238, pp. 363-371
5. Schecter, A., Furst, P., Kruger, C., Meemken, H.A., Groebel, W., Constable, J.D., Levels of polychlorinated dibenzofurans,

dibenzodioxins, PCBs, DDT, DDE, hexachlorobenzene, dieldrin, hexachlorocyclohexan and oxychlordane in human breast milk from the United States, Thailand, Vietnam and Germany (1989) Chemosphere, 18, pp. 445-454

6. Schecter, A., Toniolo, P., Dai, L.C., Thuy, L.T.B., Wolff, M.S., Blood levels of DDT and breast cancer risk among women living in the North of Vietnam (1997) Arch. Environ. Contam. Toxicol., 33, p. 453
7. Thao, V.D., Kawano, M., Matsuda, M., Wakimoto, T., Tatsukawa, R., Cau, H.D., Quynh, H.T., Chlorinated hydrocarbon insecticide and polychlorinated biphenyl residues in soils from southern provinces of Vietnam (1993) Intern. J. Environ. Anal. Chem., 50, pp. 147-159
8. Thao, V.D., Kawano, M., Tatsukawa, R., Persistent organochlorine residues in soils from tropical and sub-tropical Asian countries (1993) Environ. Pollut., 81, pp. 61-71
9. Volder, E.C., Li, Y.F., Global usage of selected persistent organochlorines (1995) Sci. Total Environ., 160-161, pp. 201-210
10. Wolff, M.S., Toniolo, P.G., Environmental organochlorine exposure as a potential etiologic factor in breast cancer (1995) Environ. Health Perspect., 103, pp. 141-145