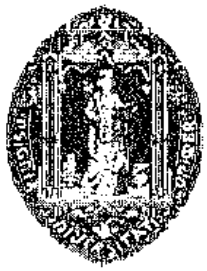

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ESTUDO DO COMPORTAMENTO TOXICOCINÉTICO DO LINDANO (γ-HCH) NO ISÓPODE TERRESTRE *Porcellionides pruinosus*

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RESUMO

A medição da concentração de um determinado composto tóxico no interior de um organismo tem demonstrado ser uma das formas mais indicadas para avaliar a sua biodisponibilidade. Os efeitos provocados por um poluente num organismo estão relacionados com a via de ingestão, assim como com a capacidade de esse organismo assimilar, acumular, metabolizar e eliminar a substância tóxica. Organismos saprotróficos não-alvo, como é o caso dos isópodes terrestres, são frequentemente expostos a compostos químicos agrícolas ou outro tipo de compostos químicos persistentes através de duas vias: o solo e/ou de alimento (matéria vegetal em decaimento).

Neste estudo, investigou-se o comportamento toxicocinético do lindano (γ-HCH) no isópode terrestre *Porcellionides pruinosus* (Brandt, 1833), comparando estas duas vias de exposição. Para isso, utilizaram-se dois tipos de solo, um solo aluvial da região do Baixo Mondego, Portugal, e o solo artificial OCDE, e como alimento, folhas de amieiro. Embora o γ-HCH seja considerado um composto químico persistente, verificou-se um decréscimo significativo na concentração do composto químico presente nas folhas de amieiro, durante os 21 dias de exposição. Os animais apresentaram valores de eficiência de assimilação entre os 10% e os 40% (numa média de 17%). Os resultados obtidos em duas experiências com solos contaminados indicaram que os animais apresentavam níveis mais elevados de γ-HCH (1359.60 pg/animal no solo artificial OCDE e 1085.30 pg/animal no solo natural) do que os animais expostos através do alimento (43.75 pg/animal). Nas experiências onde o solo constituiu a via de exposição, a quantidade de tóxico no interior dos organismos atingiu o estado de equilíbrio. Os modelos cinéticos utilizados demonstraram que a taxa de assimilação e a constante da taxa de eliminação apresentavam valores inferiores na experiência com alimento contaminado (20.66 pg/dia e 0.1/dia), quando comparada com as experiências com substrato contaminado (238.60 pg/dia e 350.54 pg/dia para a taxa de assimilação e 0,19/dia e 0.32/dia para a constante da taxa de eliminação). As diferenças encontradas nos resultados das duas vias de exposição foram explicadas através da Teoria do Equilíbrio de Partição.

Numa outra experiência os isópodes foram expostos a uma concentração constante do pesticida, através da substituição do alimento contaminado de 4 em 4 dias. Foram também utilizados modelos toxicocinéticos, calculando a taxa de assimilação, a constante

da taxa de eliminação, e a quantidade de γ-HCH presente no interior dos organismos. Nesta experiência, foi observado que uma quantidade significativa do composto tinha um destino desconhecido. Para tentar resolver este problema, foram efectuadas duas novas experiências. Em cada experiência foi utilizada uma armadilha de CO_2: uma das armadilhas era constituída por papel de filtro embebido numa solução de hidróxido de sódio (NaOH 30%) e uma outra era constituída apenas por 1 ml desta solução de hidróxido de sódio. Cada uma destas experiência foi também dividida em dois conjuntos: uma onde estavam presentes apenas folhas de amieiro contaminadas, e um outro conjunto onde os isópodes estavam em contacto com o alimento contaminado.

Comparando os resultados da primeira experiência, onde ocorreu um decaimento de pesticida nas folhas de amieiro, com a experiência onde a concentração do composto foi mantida constante, observou-se que nesta última a taxa de assimilação apresentou um valor mais baixo e a constante da taxa de eliminação apresentou um valor duas vezes maior. Para além disso, a quantidade de γ-HCH no interior dos organismos apresentou valores mais elevados na segunda experiência. A eficiência de assimilação teve valores semelhante em ambas as experiências (17%).

Das experiências onde foram aplicadas armadilhas de CO_2, foi observado que os isópodes eram, provavelmente, responsáveis por uma biotransformação mais rápida do γ-HCH. Embora a solução de 1ml NaOH (30%) utilizada numa das armadilhas tenha demonstrado ser mais eficiente do que a armadilha de papel de filtro embebido nesta solução, observou-se que as armadilhas não eram suficientemente eficientes. Por isso, de futuro deverão ser desenvolvidos novos métodos de armadilhagem de CO_2 em testes com isópodes. Os resultados obtidos sobre a quantidade de CO_2 armadilhado demonstraram a existência de uma outra possível via de exposição: a respiração, via inspiração, do composto tóxico.

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order to substantiate the results obtained here and to confirm the support of this theory for this case, kinetic studies on these two soils, including the analysis of bioavailable fraction of the test chemical, are currently being developed.

Independently of the confirmation of the equilibrium-partitioning theory, the data produced in this study enhances the importance of soil as a key exposure route when testing effects of toxic substances in saprotrophic organisms. Moreover, this aspect gains importance in agricultural fields for two main reasons: (1) pesticides are applied either by spraying in early growth stages of the crop (thus with a large proportion reaching the soil) or by direct incorporation into the soil (as granules) during sowing and (2) crop residues, after a brief composting period, are mixed thoroughly with the soil.

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