

Avila et al. Uncertainty in estimation of exposure of non-human biota JPR 24

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Study of the uncertainty in estimation of the exposure of non-human biota to ionising radiation.

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Uncertainty in estimations of the exposure of non-human biota to ionising radiation may arise from a number of sources including values of the model parameters, empirical data, measurement errors and biases in the sampling. The significance of the overall uncertainty of an exposure assessment will depend on how the estimated dose compares with reference doses used for risk characterisation. In this paper, we present the results of a study of the uncertainty in estimation of the exposure of non-human biota using some of the models and parameters recommended in the FASSET methodology. The study was carried out for semi-natural terrestrial, agricultural and marine ecosystems, and for four radionuclides (^{137}Cs , ^{239}Pu , ^{129}I and ^{237}Np). The parameters of the radionuclide transfer models showed the highest sensitivity and contributed the most to the uncertainty in the predictions of doses to biota. The most important ones were related to the bioavailability and mobility of radionuclides in the environment, for example soil-to-plant transfer factors, the bioaccumulation factors for marine biota and the gut uptake fraction for terrestrial mammals. In contrast, the dose conversion coefficients showed low sensitivity and contributed little to the overall uncertainty. Radiobiological effectiveness contributed to the overall uncertainty of the dose estimations for alpha emitters although to a lesser degree than a number of transfer model parameters.

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