# Vives i Batlle et al The estimation of absorbed dose rates for nonhuman biota an extended inter-comparison

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An exercise to compare 10 approaches for the calculation of unweighted whole-body absorbed dose rates is reported for 74 radionuclides and 5 of the ICRP's Reference Animals and Plants (duck, frog, flatfish egg, rat and elongated earthworm). Results are analysed using a non-parametric method requiring no specific hypotheses about the statistical distribution of data.

The unweighted absorbed dose rates for internal exposure compare well between the different approaches, with 70% of the results keeping within a range of variation of  20%. The variation is greater for external exposure, although 90% of the estimates are within an order of magnitude. There are some discernible patterns where specific models over- or under-predicted. These are explained on the basis of methodological differences including: number of daughter products included in the calculation of dose rate for a parent nuclide, source-target geometry, databases for discrete energy and yield of radionuclides, rounding errors in integration algorithms and intrinsic differences in calculation methods. For certain radionuclides, these factors combine to generate systematic variations between approaches.

Overall, the technique chosen to interpret the data enabled methodological differences in dosimetry calculations to be quantified and compared, allowing the identification of common issues between different approaches and providing greater assurance on the fundamental dose conversion coefficient approaches used in available models for assessing radiological effects in biota.

Additional data for this paper are available on-line