

ACTIVITY CONCENTRATIONS OF NATURAL AND ARTIFICIAL RADIONUCLIDES IN FELINE DRY FOOD

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Natural radiation exposure is an inherent condition to all living species, once radionuclides from the ^{238}U and ^{232}Th chain can nearly be found in all places. Information on radionuclides concentration and exposure levels, from natural and anthropogenic sources are absolutely necessary to investigate the possible effects that ionizing radiation can induce. These can be very different depending on the organism considered and the exposure pathway. In recent decades, the exposure of non-human species to ionizing radiation has been specially considered and investigated (ICRP, 2014) by a vast number of scientists and organizations, once they differ widely from the exposure of human beings.

Brazil holds the second largest cat and dog population in the world, consuming over 2 million tons of feed every year. The country also stands out for its production of pet food that produced 2.4 million of tons of feed in 2014, representing the world's second largest industry. A novel study regarding the radionuclide content in different dog and cat food is being developed since 2013 and preliminary results have been presented by Cavalcante, F. and Pecequilo (2014), for selected dry dog food. The present study presents an evaluation of the radionuclide and radioactivity content of different brands of dry cat food, commonly found in local markets in the city of Sao Paulo, Brazil.

Thirteen different samples were crushed into powder and kiln dried before tightly sealed in 100 mL HDPE flasks, with a plan screw cap and bubble spigot. These samples, after resting for 30 days to ensure secular equilibrium, were placed in an extended range coaxial germanium detector (Canberra XtRa GX4020 detector) for 150 ks and the acquired spectra were analyzed with the InterWinner 6.0 software (InterWinner, 2004). The natural radionuclides considered were ^{238}U , ^{232}Th and ^{40}K , the anthropogenic radionuclides investigated were ^{60}Co , ^{131}I , ^{137}Cs and ^{134}Cs .

The results for the considered artificial radionuclides have shown activity concentration values below the detector's MDA (Minimum Detectable Activity), as in Table 1.

Table 1. MDA (Minimum Detectable Activity) range values for the considered artificial radionuclides.

	^{60}Co	^{131}I	^{137}Cs	^{134}Cs
MDA (Bq/kg)	0.8 – 1.0	0.7 – 1.1	0.8 – 1.0	0.8 – 1.1

The concentrations of natural radionuclides ranged from 1.12 ± 0.29 Bq/kg to 3.77 ± 0.36 Bq/kg for ^{226}Ra ; from 1.48 ± 0.40 Bq/kg to 6.27 ± 0.78 Bq/kg for ^{232}Th and from 216.8 ± 11.2 Bq/kg to 361.7 ± 16.8 Bq/kg for ^{40}K , as shown in Figure 1.

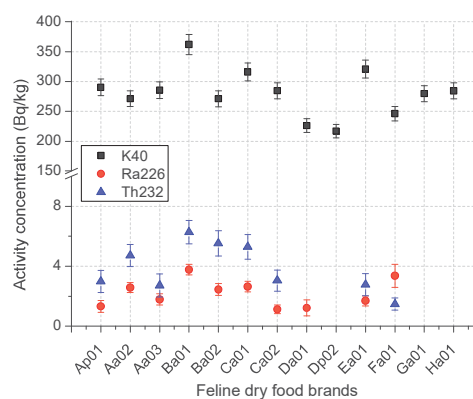


Figure 1. ^{226}Ra , ^{232}Th and ^{40}K activity concentration values for 13 different samples of dry cat food. Producers brands are labelled from A to H, (a) meaning adults and (p) puppy cats.

The results suggest that the samples evaluated have no contamination of artificial radionuclides and the natural radionuclides concentration will not contribute to significant absorbed dose by their ingestion. Therefore, the authors conclude that these studied brands carry no radiological risk for the animals ingesting them.

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References

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