

# Radiological Protection and Nuclear Safety

## Environmental Radioactivity

### Books and Book Chapters

F.P. Carvalho, J.M. Oliveira, Natural Radioisotopes  $^{210}\text{Po}$  and  $^{210}\text{Pb}$  in Human Hair as an Indicator of Exposure, in *Metal Ions in Biology and Medicine*, Vol 9 (2006) 570-576.

I. Lopes, M. J. Madruga, Gross  $\alpha/\beta$  Measurements in Drinking Waters by Liquid Scintillation Technique: Validation and Interlaboratory Comparison Data, in *Combining and Reporting Analytical Results* (2006) 294-300.

### Journals

F.P. Carvalho, Agriculture, Pesticides, Food Security and Food Safety, *Environmental Science and Policy* 9 (2006) 685-692

F.P. Carvalho, J. M. Oliveira, Polonium in Cigarette Smoke and Radiation Exposure of Lungs, *Czechoslovak J. Physics* 56 (Suppl. D) (2006) 697-703

J.T. Smith, N.V. Belova, A.A. Bulgakov, R.N.J. Comans, A.V. Konoplev, A.V. Kudelsky, M.J. Madruga, O.V. Voisekhovitch and G. Zibold, The "AQUASCOPE" simplified model for predicting  $^{89,90}\text{Sr}$ ,  $^{131}\text{I}$  and  $^{134,137}\text{Cs}$  in surface waters after a large-scale radioactive fallout, *Health Physics*, 89 6 (2005) 628-644

M.J. Madruga, M.M. Sequeira, I. Lopes, L. Silva, Radioactividade nos rios Tejo e Zézere, *Radioprotecção*, Vol II, nº 6-9 (2006) 40-50.

M. J. Reis, H. Fonseca, Activity Size Distributions of Natural Radioactive Aerosols in Outdoor Air, *Radioprotecção*, Vol II, nº 6-9 (2006) 118-126.

M.K. Pham, J.A. Sanchez-Cabeza, P.P. Povinec, D. Arnold, M. Benmansour, R. Bojanowski, F.P. Carvalho, *et al.*, Certified reference material for radionuclides in fish flesh ample IAEA-414 (mixed fish from the Irish Sea and North Sea), *Applied Radiation and Isotopes* 64 (2006) 1253-1259.

J.M. Oliveira, F.P. Carvalho, A Sequential Extraction Procedure for Determination of Uranium, Thorium, Radium, Lead and Polonium Radionuclides by Alpha Spectrometry in Environmental Samples, *Czechoslovak J. Phys.* 56 (Suppl. D) (2006) 545-555

F.P. Carvalho, Segurança das fontes radioactivas: porque é importante e porque nos diz respeito, *Segurança* Nº 174 (2006) 53-57

F.P. Carvalho, Incineração de resíduos sólidos hospitalares e substâncias radioactivas, *TecnoHospital* Nº23 (2006) 30-34

F.P. Carvalho; J.V. Paiva, J. Carvalho, M.J. Batista, Qualidade do Ambiente Interior e Certificação dos Produtos de Construção para a Radioactividade, *Construção Magazine* Nº 18 (2006) 32-37.

F.P. Carvalho, A radioactividade na água para consumo, *Tecnologia da Água* Nº46 (2006) 54-61

### Conference Proceedings

F.P. Carvalho, Água para Consumo, Exposição às Radiações Ionizantes e Dose Indicativa Total, *8º Conf. Nacional da Água*, Figueira da Foz 13-17 Mar. 2006, Livro de Resumos, p. 302, CD-ROM

F.P. Carvalho, Bacias Hidrográficas do Centro do País: Protecção da Qualidade Radiológica da Água e dos Sedimentos, *12º Encont. Nac. Saneamento Básico*, 24-27 Out., Cascais, Liv. Res., 219-22, CD-ROM

F.P. Carvalho, J.V. Paiva, J. Carvalho, M.J. Batista, Exposure to Ionizing Radiation and Dangerous Substances inside Buildings Related to Construction Products, *Proc. Int. Conf. Healthy Buildings HB2006*, 4-8 June, Lisbon, Vol. II (2006) 495-500.

F.P. Carvalho, J.M. Oliveira, I. Lopes, O Complexo Mineiro da Urgeiriça: 1- Radioactividade na Ribeira da Pantanha, *Actas VII Congresso Nac. de Geologia*, Vol II (2006), 455-458, Univ. Évora, Portugal

F.P. Carvalho, J.M. Oliveira, I. Lopes, O Complexo Mineiro da Urgeiriça: 2. Radioactividade no Sistema Hidrogeológico Sub-Superficial, *Actas do VII Congresso Nac. Geologia*, Vol II (2006) 459-462

F.P. Carvalho, M.C. Reis. Radon in Portuguese Houses and Workplaces, *Proc. Int. Conf. Healthy Buildings HB2006*, Vol. II, pp 507-511, Lisbon 4-8 June 2006, Portugal

F.P. Carvalho, M.J. Madruga, M.C. Reis, J.G. Alves, J.M. Oliveira, M.M. Leite, E.M. Pinto, J.M. Falcão, Exposure to Enhanced Levels of Radioactivity and Toxic Metals in Uranium Mining Areas, *Proc. 2nd Eur. IRPA Congress on Radiation Protection*, Paris, 15-19 May 2006, CD-ROM

H. Fonseca, M.J. Reis, Evaluating the temporal evolution of  $^7\text{Be}$  and  $^{210}\text{Pb}$  atmospheric concentrations by using chronological series analysis techniques, *XI Int. Congress Int. Assoc. for Mathematical Geology*, Liège, 3-8 Sept. 2006.

I. Lopes, M.J. Madruga, G. Ferrador, M.M. Sequeira, E. Oliveira, A. Gomes, F. Rodrigues, F.P. Carvalho,

Monitoring of Gross Alpha, Gross Beta and Tritium Activities in Portuguese Drinking Waters, *2<sup>nd</sup> Eur. IRPA Congress on Radiation Protection*, Paris, 15-19 May 2006, CD-ROM.

J.M. Falcão, F.P. Carvalho, M.M. Leite, M. Alarcão, E. Cordeiro, J. Ribeiro, MINURAR-Uranium mines and their residues: health effects in a Portuguese population, *2<sup>nd</sup> Eur. IRPA Congress on Radiation Protection*, Paris, 15-19 May 2006, CD-ROM.

J.M. Falcão, F.P. Carvalho, M.M. Leite, M. Alarcão, E. Cordeiro, J. Ribeiro, E.M. Pinto, N. Ferreira, MINURAR-Minas de Urânia e seus resíduos: efeitos na saúde da população. Estudo da distribuição dos metais e outros contaminantes químicos no ambiente, *Actas VII Congr. Nac. Geologia*, Vol II (2006) 347-350

M.J. Madruga, I. Faria, The  $^{226}\text{Ra}$ ,  $^{210}\text{Pb}$  and Essential Elements Bioavailability to Pines at Urgeiriça Uranium Mill Tailings, *2<sup>nd</sup> Eur. IRPA Cong. Radiation Protection*, Paris, 15-19 May 2006, CD-ROM.

M.J. Reis, H. Fonseca, L. Silva, Temporal Variation of  $^7\text{Be}$  and  $^{210}\text{Pb}$  Activity Concentrations in Aerosols Particles in Ground Level Air at Sacavém (Portugal). *2<sup>nd</sup> Eur. IRPA Congress on Radiation Protection*, Paris, 15-19 May 2006, CD-ROM

F.P. Carvalho, Uso dos recursos naturais: desenvolvimento sustentável e educação ambiental, *XII Jornadas de Educação Ambiental*, Boletim da Assoc. Port. Educação Ambiental, Jan. 2006, 51-52

## Communications

Batista, F.P. Carvalho, J.M. Oliveira, Contribuição para o conhecimento da população piscícola dos Rios Távora, Dão, Vouga e Mondego, *II Congresso Ibérico de Ecologia*, Lisboa 18-21 Julho 2006. Livro de Resumos, p.47, Univ. Lisboa, Portugal.

F.P. Carvalho, J.M. Oliveira, Natural radioisotopes  $^{210}\text{Po}$  and  $^{210}\text{Pb}$  in human hair as an indicator of exposure, *9<sup>th</sup> Int. Symp. Metal Ions in Medicine and Biology*, 21-24 May 2006, Lisbon, Abstract p. 166

F.P. Carvalho, J.M. Oliveira, I. Lopes, A. Batista, Radioactividade nos rios da região das Beiras Portuguesas, *II Congresso Ibérico de Ecologia*, Lisboa, 18-21 Julho 2006, Livro de Resumos p. 148

Lopes, M.J. Madruga, Gross  $\alpha/\beta$  Measurements in Drinking Waters by Liquid Scintillation Technique: Validation and Interlaboratory Comparison Data, *Int. Workshop Combining and Reporting Analytical Results. The Role of (metrological) Traceability and (measurement) Uncertainty for Comparing Analytical Results*, Rome, 6-8 March 2006.

Lopes, M.J. Madruga, Strontium-90 Determination in Milk, by Extraction Chromatography Using Liquid Scintillation Technique, *XX Encontro de Química*, Costa da Caparica, 14-16 Dec. 2006, Book Abstracts, p. 234 (poster).

J.M. Falcão, F.P. Carvalho, M.M. Leite, M. Alarcão, E. Cordeiro, J. Ribeiro, Assessment of health effects and environmental contamination in the region of old uranium mines, Portugal. Results of the MinUrar project, *XII Jornadas da Soc. Port. Proteção Contra Radiações*, Lisboa 27-28 Nov. 2006, Liv. Resum. 6 pp

M. Malta, J.M. Oliveira, A.P. Libânio, F.P. Carvalho, Variação Temporal da Concentração de  $^{210}\text{Po}$  e  $^{210}\text{Pb}$  em Mexilhões (*Mytilus galloprovincialis*) no Estuário do Tejo, *II Congresso Ibérico de Ecologia*, Lisboa 18-21 Julho 2006, Livro Resumos, p. 183.

## Internal Reports

M.J. Madruga, F.P. Carvalho, M. Reis, N. Pinhão, J. Alves, M.M. Sequeira, G. Ferrador, M.A. Gameiro, J.M. Oliveira, A. Libânio, M.A. Pereira, G. Silva, I. Lopes, L. Silva, J. Abrantes, L. Machado, A.R. Gomes, A.S. Lemos, E. Oliveira, F. Rodrigues, G. Carvalhal, H. Fonseca, L. Novais. Vigilância Radiológica a Nível Nacional (Ano 2005), DPRSN, Série A, nº30/2006, ISBN 972-8660-31-6, Depósito Legal 194022/03, pp. 83.thers.

---

# Measurement Unit

---

## Internal Reports

J. Abrantes, N.R. Pinhão, Procedimento para a determinação da actividade de amostras com detectores proporcionais de fluxo gasoso, ITN report 2006.

J. Saraiva, N.R. Pinhão, Caderno de Especificações: NucLIMS – Nuclear Laboratory Information Management System, ITN report, 2006.

## Communications

N.R. Pinhão, J. Abrantes, I.F. Gonçalves and M. Mercier, Detection efficiency for a thin homogeneous source in parallel – disk source and detector geometry, *10<sup>th</sup> Int. Symp. Radiation Physics*, Coimbra, 17-22 Sept. 2006, poster

L. Silva, J. Abrantes, G. Carvalhal, J. Oliveira and N. Pinhão, Environmental Radionuclide Measurements in Portugal, *10<sup>th</sup> Int. Symp. Radiation Physics*, Coimbra, 17-22 Sept. 2006, poster

## Radiological Protection and Radioactive Waste Management

---

### Conference Proceedings

C. Carrapiço, L. Portugal, I.F. Gonçalves, I. Paiva, R. Trindade, P. Vaz, Optimization of a detection system to measure samples. Radionuclide content and activity, *14<sup>th</sup> Biennial Topical Meeting of Radiation Protection and Shielding Division*, Carlsbad New Mexico, USA, April 2006

P. Duarte, I. Paiva, R. Trindade, A. Mateus, Suitable areas for a long-term radioactive waste storage facility in Portugal, *2<sup>nd</sup> European IRPA Congress on Radiation Protection, Paris*, May 2006

L. Portugal, C. Oliveira, R. Trindade, I. Paiva, A contribution to the analysis of the activity distribution of a radioactive source trapped inside a cylindrical volume using the MCNPX Code, *2<sup>nd</sup> European IRPA Congress on Radiation Protection, Paris*, May 2006

C. Carrapiço, L. Portugal, I.F. Gonçalves, I. Paiva, R. Trindade, P. Vaz, A Methodology for the Determination of the Radionuclide Contents and Activity of Samples, *10<sup>th</sup> Int. Symp. on Radiation Physics*, 17-22 Sept., 2006, Coimbra, Portugal

C. Carrapiço, L. Portugal, I.F. Gonçalves, I. Paiva, R. Trindade, P. Vaz, Workshop on Use of Monte Carlo Techniques for Design and Analysis of Radiation Detectors *10<sup>th</sup> Int. Symp. on Radiation Physics*, 17-22 Sept., 2006, Coimbra, Portugal

### Internal Reports

R. Trindade, I. Paiva L. Portugal, P. Duarte, L. Brás, J. Venâncio, J. Sebastião, L. Madureira, J. Trincheira, A. Baptista, T. Ventura, 30 reports as follows: Nuclear vessels (4), Scrap metal (7), Medical and industrial facilities (18) Transport of radioactive materials (1).

## Dose Assessment and Dose Registry

---

### Journals

V. Kamenopoulou et al., Aspects of Harmonization of Individual Monitoring for External Radiation in Europe: Conclusions of a EURADOS Action, *Radiat. Prot. Dosim.* 118, 2, (2006). 139-143

J.G. Alves, J.N. Abrantes, S. Rangel, Implications of the high voltage induced variation of the TL readings, *Radiat. Prot. Dosim.* 120, 1-4 (2006) 293-297

J.G. Alves, J.N. Abrantes, O. Margo, S. Rangel, L. Santos, Long-term stability of a TLD-based individual monitoring system, *Radiat. Prot. Dosim.* 120, 1-4, (2006) 289-292

M.B. Martins, J.G. Alves, J.N. Abrantes, A.R. Roda, Occupational Exposure in Nuclear Medicine in Portugal in the 1999-2003 Period, *Radiat. Prot. Dosim.*, doi 10.1093/rpd/ncl564 (2006)

J.G. Alves, J. Mairos, In-flight dose estimates for aircrew and pregnant female crew members in military transport missions, *Radiat. Prot. Dosim.* (2006) doi 10.1093/rpd/ncl560

### Conference Proceedings

J.G. Alves, L. Novais, S. Rangel, E. Flores, A. Libânia, QA/QC Programme in use at the IMS of ITN-DPRSN, *IRPA Conf.*, Paris, May 2006, CD-ROM

M.B. Martins, J.G. Alves, J.N. Abrantes, A.R. Roda, Occupational Exposure in Portugal in the 1999-2003 Period, *IRPA Conf.*, Paris, May 2006, CD-ROM

### Communications

F. Carvalho, M. J. Madruga, M. Reis, J.G. Alves, J.M. Oliveira, M. Machado Leite, E. Macedo Pinto, J.M. Falcão, Exposure to enhanced levels of radioactivity and toxic metals in Uranium mining areas. *2<sup>nd</sup> European IRPA Conf.*, Paris, May 2006, poster.

J.G. Alves, L. Novais, S. Rangel, Environmental gamma radiation monitoring at ITN. *10<sup>th</sup> Int. Symp. Radiation Physics*, Coimbra, Portugal, Sept 2006

## Radiological Risk and Safety Assessment

---

### Journals

M.I.M. Prata, A. C. Santos, S. Torres, J. P. André, J. A. Martins, M. Neves, M. L. Gracia-Martin, T. B. Rodrigues, P. López-Larrubia, S. Cerdán and C. F. G. C. Geraldes, Targeting of lanthanide (III) chelates of

DOTA-type glycolconjugates to the hepatic asialoglyco- protein receptor: cell internalization and animal imaging studies. *Contrast Media & Molecular Imaging* 1: 246-258 (2006)

M.A. Videira, L. Gano, C. Santos, M. Neves and A. J. Almeida, Lymphatic uptake of lipid nanoparticles following endotracheal administration. *J. Microencapsulation*, 23(8): (2006), 855-862

S. Marrone et. al., Measurement of the  $^{151}\text{Sm}(\text{n},\gamma)$  cross section from 0.6 eV to 1 MeV via the time-of-flight technique at the CERN n\_TOF facility. *Phys. Rev. C* 73, 034604 (2006)

G. Aerts et. al., The neutron capture cross section of  $^{232}\text{Th}$  measured at the n\_TOF facility at CERN in the unresolved resonance region up to 1 MeV. *Phys. Rev. C* 73, 054610 (2006)

C. Domingo-Pardo et. al., New Measurement of neutron capture resonances for  $^{209}\text{Bi}$ , *Phys. Rev. C* 74, 025807 (2006)

### Conference Proceedings

A. Oliveira, Energy and Entropy in Radiation Dosimetry and Protection, Proceedings of full papers, *IRPA Congress Radiation Protection*, Paris, May 2006

M.J. Silva, M.G. Boavida, A.C. Sousa, P. Costa, A. Dias, O.M. Gil, P.C. Painço, L. Pedro, J.Cardoso, L. Santos, P. Nogueira, J. Marinho-Falcão, An evaluation of cytogenetic damage in a population exposed to uranium mines residues", *36<sup>th</sup> Annual Meeting Eur. Environmental Mutagen Society*, Abstract book p. 215, P-149, Prague, Czech Republic, July 2-6, 2006

Oliveira and M. Neves, Cellular dosimetry studies in cell clusters, Abst. *Annual Congress Eur. Assoc. Nuclear Medicine, Radionuclide Therapy/Dosimetry*, S337, Athens, Greece, 30 Sept - 4 Oct. 2006

C. Carrapico, L. Portugal, I.F. Gonçalves, I. Paiva, R. Trindade, P. Vaz, Optimization of a detection system to measure samples' radionuclide contents and activity, Proc. *14<sup>th</sup> Biennial Topical Meet. Radiation Protection and Shielding Division* (2006) 362-364.

M. Heil et. al. Neutron capture cross section measurements for nuclear astrophysics at n\_TOF, Proc. *Symp. "Nucleus in the Cosmos IX"*, CERN, Genebra, 25-30 June 2006.

M. Mosconi et al., Experimental challenges for the Re/Os clock, Proc. *Symp. "Nucleus in the Cosmos IX"*, CERN, Genebra, 25-30 June 2006.

C. Domingo Pardo et al., Neutron capture measurement on the s-process termination isotopes lead and bismuth, Proc. *Symp. "Nucleus in the Cosmos IX"*, CERN, Genebra, 25-30 June 2006.

S. Marrone et al., Astrophysical Implications of the  $^{139}\text{La}(\text{n},\gamma)$  and  $^{151}\text{Sm}(\text{n},\gamma)$  Cross Section Measured at n\_TOF, Proc. *Symp. "Nucleus in the Cosmos IX"*, CERN (Genebra), 25-30 June 2006.

G Tagliente et al., Measurements of the  $^{90,91,92,94,96}\text{Zr}$  neutron capture cross sections at n\_TOF, Proc. *Symp. "Nucleus in the Cosmos IX"*, CERN, Genebra, 25-30 June 2006.

C. Guerrero et al., Measurement at n\_TOF of the  $^{237}\text{Np}(\text{n},\gamma)$  and  $^{240}\text{Pu}(\text{n},\gamma)$  Cross Sections for the Transmutation of Nuclear Waste, Proc. *Conf. PHYSOR 2006*, Vancouver (Canadá), 10-14 Sep 2006.

W Dridi et al., Measurement of the neutron capture cross section of  $^{234}\text{U}$  in n\_TOF at CERN, Proc. *Conf. PHYSOR2006*, Vancouver, Canada, 10-14 Sept. 2006

F. Gunsing et al., Measurement of the neutron capture cross section of  $^{236}\text{U}$ , Proc. *Conf. PHYSOR2006*, Vancouver, Canada, 10-14 Sept. 2006

C. Paradela et al., n\_TOF fission data of interest to GEN-IV and ADS, Proc. *Conf. PHYSOR 2006*, Vancouver, Canada, 10-14 Sept. 2006

G. Van den Eynde et al., The Transmutation and Irradiation Performances of the XT-ADS, Proc. *Ninth Information Exchange Meeting on Actinide and Fission Products Partitioning and Transmutation*, Nîmes, France, 25-29 Sept. 2006.

### Communications

A. Oliveira and M. Neves, Cellular dosimetry studies in cell clusters. *Annual Congress Eur. Association of Nuclear Medicine, Radionuclide Therapy/Dosimetry*, Athens, Greece, 30 Sept. – 4 Oct. 2006 (poster)

F.C. Teixeira, I.F. Antunes, M.J.M. Curto, M. Neves, L. Gano, Synthesis, Radiochemical Characterization and Studies In Vitro and In Vivo of New Indazolebisphosphonates Sm-153 Complexes, *Medicinal Chemistry in the 21st Century*, Faculdade Farmácia Univ. Lisboa, 13-14 Oct. 2006 (poster)

F.C. Teixeira, I.F. Antunes, M.J.M. Curto, R. Fausto, M. Rosado, M. Neves, Synthesis, characterization and molecular modelling studies of new Indazolebisphosphonates, *Medicinal Chemistry in the 21st Century*, Fac. Farmácia Univ. Lisboa, 13-14 Oct. 2006 (poster)

F.C. Teixeira, I.F. Antunes, M.J.M. Curto, M. Neves, Synthesis of New Hydroxy- and Aminoindazolebisphosphonates, *XX Encontro Nac. da Sociedade Portuguesa de Química*, P222, FCT/UNL, Caparica, 14-16 Dec. 2006 (poster).

O.M. Gil, Sensibilidade à radiação ionizante: Avaliação dos efeitos genéticos decorrentes do tratamento com  $^{131}\text{I}$  em doentes com carcinoma da tireóide, Curso de Extensão Universitária em Toxicologia Genética e Toxicogenómica, Centro de Investigação em Genética Molecular Humana, Univ. Nova de Lisboa, Maio 2006 (oral).

### Theses

#### Graduation

C. Carrapico, Medição de secções eficazes de captura neutrónica no espetrómetro TOF do CERN, utilizando um calorímetro de Fluoreto de Bário, Univ. Algarve, Supervisors: I.F. Gonçalves, P. Vaz, 2006.