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EDITORIAL

Dear reader,

It is a great pleasure to provide you the third issue of Atom Indonesia in 2020, namely Vol. 46 No. 3 (2020). Since SCOPUS and Web of Science (WOS) indexed Atom Indonesia, the number of articles submitted to Atom Indonesia has significantly increased. To retain the quality of the publications, all articles submitted to Atom Indonesia are peer reviewed by qualified editors and reviewers and is supported by a professional administration team.

The Atom Indonesia Vol. 46 No. 3 (2020) contains eight articles discussing various aspects and applications of nuclear science and technology. The contributors of those articles are not only from various national institutions and universities, but also from international institutions.

"The Use of Image Processing and Analysis in Automated Biological Dosimetry" was explored by D. Ramadhani from Doctoral Program for Biomedical Sciences, Faculty of Medicine, Universitas Indonesia under collaboration with M. Syaifudin and S. Purnami from Center for Technology of Safety and Radiation Metrology, National Nuclear Energy Agency (BATAN), Indonesia and A. Naroeni from Virology and Cancer Pathobiology Research Center, Faculty of Medicine, Universitas Indonesia, Indonesia. Biological dosimetry based on cytogenetic markers such as dicentric chromosome (DC) and micronuclei (MN) is, until now, the most frequently used method to estimate the radiation dose in the radiological accident event. Another biomarker that recently gains popularity in biodosimetry is γH2AX. All these three assays are microscope-based biodosimetry techniques, and therefore need manual scoring to estimate the radiation dose. Unfortunately, the manual scoring of these assays is time-consuming and labor-intensive. This article describes how image processing and analysis were applied in automated biodosimetry based on the DC, MN, and γH2AX assays.

"Eye Lens Doses Received by Radiation Workers in Interventional Medical Procedures" was written by E. Hiswara, D. Kartikasari, H. Sofyan, N. Nuraeni and K.Y.P. Sandy from Center for Technology of Safety and Radiation Metrology, National Nuclear Energy Agency (BATAN), Indonesia. The International Commission on Radiological Protection (ICRP) has recently recommended that the occupational dose limit for the eye lens be reduced to 20 mSv per year, averaged over defined periods of 5 years, with no single year exceeding 50 mSv. ICRP clearly states that the recommendations are chiefly based on epidemiological evidence that suggested the eye lens dose threshold for cataract induction revised downwards from 2-5 Gy to about 0.5 Gy. Interventional medical workers are at greater health risk from radiation exposure to eyes as a result of the procedures they undertake than most other medical specialists. An extensive study has been carried out to measure the eye lens doses received by 373 interventional medical radiation workers in twelve large hospitals in Indonesia. This paper reports the measurement of occupational eye lens doses for various types of interventional procedures in radiology and cardiology.

"Calculation of Energy Levels and Reduced Electric Quadrupole Transition Probability for ^{22}F Isotope Using Oxbash Code" was explored by A.K. Hasan and B.A. Zayed from Department of Physics, College of Education for Girls, University of Kufa, Kufa, Najaf Governorate, Iraq. A study on the calculation of energy levels and reduced electric quadrupole transition probability for fluorine-22 isotope using Oxbash Code has been carried out. The shell model and OXBASH was used to calculate the energy levels and probability of quadratic transition B(E2) of the 22F isotope in the SD region through PW, CWH active interactions. A comparison was made between the calculation results and the experimental data.

"Reactivity Initiated Transient Response of TRIGA with the Progress of Core Burnt" was written by F. Haque from Military Institute of Science and Technology, Mirpur Cantonment, Dhaka, Bangladesh under collaboration with N.H. Badrun from Reactor Physics and Engineering Division, INST, AERE, Ganakbari, Bangladesh. This paper illustrates the effects on safety of TRIGA Mark-II research reactor of Bangladesh at its different steps of core burnt during reactivity induced transient. The modeling and simulation were carried by coupled point kinetics, neutronics, and thermal hydraulics code EUREKA-2/RR based on neutronics data calculated previously by Monte Carlo code for different burnt states of TRIGA core. Three burn steps until 150 MWD have been considered for present analysis, which are regarded here as beginning of cycle (BOC); middle of cycle, MOC (75 MWD); and end of cycle, EOC (150 MWD).

"Effects of Gamma Irradiation on Mating Competitiveness of Male Culex quinquefasciatus (Diptera: Culicidae) in Laboratory" was explored by T. Ramadhani and S. Sunaryo from Banjarnegara Vector Control Research Unit, National Institute of Health Research and Development, Banjarnegara, Jawa Tengah Indonesia under collaboration with U.K. Hadi and S. Soviana from Entomology Laboratory, Department of Animal Infectious Diseases and Veterinary Public Health, Faculty of Veterinary Medicine - Bogor Agricultural University, Bogor, Indonesia, Z. Irawati and A. Rahayu from Center for Isotopes and Radiation Application, National Nuclear Energy Agency (BATAN), Jakarta, Indonesia. Culex quinquefasciatus is the main vector of lymphatic filariasis in Pekalongan City. Sterile Insect Technique (SIT) can be employed as complementary vector control for filariasis. The key success of this technique depends on the ability of laboratory-reared sterile males to mate with the wild-type females. This research aimed to was to determine the mating competitiveness, fecundity and fertility of sterile males of Cx. quinquefasciatus. The pupae of Cx. quinquefasciatus were gamma irradiated at doses of 60, 70, and 80 Gy, whereas unirradiated pupae were prepared as control. The mosquitoes emerging from the irradiated pupae were found to be able to mate with normal females in the cages.

"Molecular and in silico Study of TP53 Codon 72 Polymorphism (rs1042522) in a Population Exposed to High Background Radiation in Mamuju-West Sulawesi" was written by D. Tetriana, S. Purnami, T. Rahardjo, W. Mailana, S. Nurhayati, E. Pudjadi from Center for Safety Technology and Radiation Metrology, National Nuclear Energy Agency (BATAN), Jakarta Selatan, Indonesia under collaboration with D. Ramadhani from Doctoral Program for Biomedical Sciences, Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia S. , Tri Widyaningtyas from Virology and Cancer Pathobiology Research Center, Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia and T. Ishida from Unit of Human Biology and Genetics, Department of Biological Sciences, Graduate School of Science, University of Tokyo Japan. The evaluation of the tumor protein p53 (TP53) codon 72 polymorphism (rs1042522) status in a population exposed to high background radiation was performed in this study. Real-time polymerase chain reaction (Q-PCR) was used to genotype the rs1042522 polymorphism in 100 subjects from Takandeang, Salleto, and Ahu villages in Mamuju district, West Sulawesi. An in silico study was then conducted to identify the potential effects of the proline substitution associated with this polymorphism on protein stability. The in silico analysis was performed using three different computational tools, namely I-Mutant Suite, iStable, and Protein Variation Effect Analyzer (PROVEAN). Secondary and three-dimensional (3D) structural models for wild-type (WT) and variant TP53 were generated to predict potential structural changes in the protein.

"Finite-Difference Time-Domain Simulations of Radon Transport in Porous Media" was explored by A. Tayebi and M. El Maghraoui from Laboratory of Optoelectronics, Physical Chemistry Materials and Environmental, Faculty of Sciences, Ibn Tofail University, Morocco under collaboration with H. Bezzout and H. El Faylali from Laboratory of Computer Science, Systems and Optimization (Informatics, Systems and Optimization), Faculty of Sciences, Ibn Tofail University, Morocco. In this work, an efficient algorithm, using a finite-difference time-domain (FDTD) technique, is proposed for modeling the variation of radon concentration as a function of soil structure parameters and vice versa. The development of the FDTD model is based on the simultaneous resolution of the radon transport equation in a porous, homogeneous

medium, namely the soil. The numerical results are compared with those of the literature or with the theoretical ones.

"Neutronics Assessment of Accident-Tolerant Fuel in Advanced Power Reactor 1400 (APR1400)" was written by D. Hartanto, A. Alshamsi, A. Alsuwaidi, A. Bilkhair, H.A. Hukal and M. Zubair from Department of Mechanical & Nuclear Engineering, University of Sharjah, Sharjah, United Arab Emirates. Safety and reliability are the most desirable conditions that each nuclear power plant should improve. Since the Fukushima Daiichi accident, Accident-Tolerant Fuel (ATF) has been extensively researched to improve the performance of the nuclear fuel system. This paper presents the investigation of the ATF system from a neutronics perspective, which positively reflects on the performance of the APR1400 nuclear power plant. Several advanced fuel candidates such as UC, U_3Si_2, and UN, which have better thermophysical properties than current UO_2 nuclear fuel, have been considered.

On behalf of Atom Indonesia, I would like to thank you all for your contributions and endless support that have allowed Atom Indonesia to reach an outstanding performance for all the years. This outstanding achievement could not have been reached without great efforts and cooperation from the editors, reviewers, management personnel, authors, and readers.

Editor in Chief