



# COETox

International Conference of Environmental and Occupational Health

---

## ABSTRACT BOOK

---



**iBAMTOX**  
Ibero-American Meeting on Toxicology and Environmental Health

**2016**

**21-23 June | Porto**



## FOREWARD



On behalf of the Organising Committee, I would like to cordially welcome you to the *3rd International Conference on Occupational & Environmental Toxicology* (ICOETox 2016), which is held in Porto in conjunction with the *3rd Ibero-American Meeting on Toxicology and Environmental Health International* (IBAMTOX 2016).

This conference is co-organised by the Portuguese National Institute of Health (INSA), the Institute of Public Health- Universidade do Porto (ISPUP) and the Instituto de Ciências, Tecnologias e Agroambiente da Universidade do Porto (ICETA-UP).

The Organising Committee was successful in inviting a number of outstanding international and local speakers in order to offer you a very attractive scientific programme. The Conference covers most of the current topics of Environmental and Occupational Toxicology; we have tried to achieve a good balance between research and practice and to allow sufficient time for interaction and discussion. This meeting provides a good opportunity for divulging one's work and discussing a great variety of topics that we hope will be reflected in a fruitful interchange of experiences, knowledge and ideas. It is also a chance for renewing old contacts and making many new friends.

The city of Porto, known as *Invicta* (unvanquished) City, has an important historical legacy, although architectural images show its urban renovation process giving valuable testimony of its history and modernity. Indeed, Porto historical centre was designated World Cultural Heritage in 1996 due to the many historical buildings and urban mesh. Porto is divided between the river Douro and the Atlantic Ocean, and boasts of poetic sunsets where the eyes absorb and the soul savours. Downtown is located the busiest commercial area, where typical products are found alongside prestigious designer brands. It is also worth highlighting the world famous Porto Wine, produced exclusively in the Douro Demarcated Region and aged in cellars. And finally, our visitors should not forget to try our local cuisine, as Porto has gone beyond tradition in order to reach the best international standards.

I would like to express my sincere thanks to our collaborating institutions and all those organisations and companies which put their trust in this project and provided sponsorship for the meeting; without their effort, support and collaboration this Conference would not have been possible.

I hope that, despite the tight scientific programme, you will find some time to enjoy our landscapes, typical food, and kind people, and that this meeting will meet all your expectations from the scientific and social points of view. I wish you a productive Conference and a pleasant stay in Porto. Thank you for being here.

Bem-vindos ao Porto!

(João Paulo Teixeira)

ICOETox 2016 | IBAMTOX 2016 Scientific Committee



## LOCAL ORGANISING COMMITTEE

JOÃO PAULO TEIXEIRA  
CARLA COSTA  
SOLANGE COSTA  
CRISTIANA PEREIRA  
SÓNIA FRAGA  
ANA MENDES

## SCIENTIFIC COMMITTEE

JOÃO PAULO TEIXEIRA – PORTUGAL  
FERNANDO BARBOSA - BRAZIL  
ANDREW COLLINS - UK  
BLANCA LAFFON - SPAIN  
CARLA COSTA - PORTUGAL  
CRISTIANA PEREIRA - PORTUGAL  
FÉLIX CARVALHO - PORTUGAL  
ANA MENDES - PORTUGAL  
LANG TRAN - UK  
MARIA DUSINSKA - NORWAY  
NURSEN BASARAN - TURKEY  
PETER MOLLER - DENMARK  
SAM KACEW - CANADA  
SÓNIA FRAGA - PORTUGAL  
SOLANGE COSTA - PORTUGAL  
STEFANO BONASSI - ITALY  
VANESSA ANDRADE - BRAZIL  
VANESSA VALDIGLESIAS – SPAIN

## SPONSORS



An  **InSTEM** company  
**PERCEPTIVE**  
INSTRUMENTS



**Taylor & Francis**  
Taylor & Francis Group



**SURFACE-MODIFIED TiO<sub>2</sub> NANOPARTICLES WITH ASCORBIC ACID:  
ANTIOXIDANT PROPERTIES AND EFFICIENCY AGAINST DNA DAMAGE**

V. Bajić<sup>2</sup>, Biljana Spremo-Potparević<sup>1,\*</sup>, L. Živković<sup>1</sup>, A. Čabarkapa<sup>1</sup>, I. Vukoje<sup>2</sup>, J. Kotur-Stevuljević<sup>1</sup>, J.M. Nedeljković<sup>2</sup>

<sup>1</sup>Faculty of Pharmacy University of Belgrade, Serbia; <sup>2</sup>Institute of Nuclear Sciences Vinča, University of Belgrade, Serbia

\*presenting author: [bilja22@pharmacy.bg.ac.rs](mailto:bilja22@pharmacy.bg.ac.rs)

Ascorbic acid (AA) is a standard antioxidant and its radical scavenging properties also appear to be responsible for its antigenotoxic properties. Nanoparticle-mediated delivery of antioxidant compounds is intended to increase their bioavailability while maintaining their effectiveness. Colloids consisting of the 45-Å TiO<sub>2</sub> nanoparticles (NPs) with anatase crystal structure were prepared by acidic hydrolysis of TiCl<sub>4</sub>. The synthesized TiO<sub>2</sub> NPs were characterized using transmission electron microscopy and X-ray diffraction analysis. The charge transfer (CT) complex formation between surface Ti atoms and AA is indicated by immediate appearance of red color.

The aim of this study was to compare, for the first time, the antioxidant and antigenotoxic effects of AA attached to the surface of TiO<sub>2</sub> NPs with free AA in a wide concentration range. For evaluation of antigenotoxic properties whole blood cells were first treated with 50 µM H<sub>2</sub>O<sub>2</sub> to induce DNA damage, and then exposed to 3 different concentrations of free AA ( $1.3 \times 10^{-2}$ ,  $2.6 \times 10^{-2}$ , and  $3.9 \times 10^{-2}$  M) and the same concentrations of AA attached to TiO<sub>2</sub> NPs (0.05, 0.1, and 0.15 M) for 30 min at 37 °C. The level of DNA damage was evaluated by comet assay method. For evaluation of antioxidant properties, total antioxidant capacity (TAC), total antioxidative status (TAS) and prooxidative-antioxidative balance (PAB) were determined in human serum pool during 2 and 24 h incubation at 37 °C, without and with *tert*-butylhydroperoxide (TBH) as exogenously added oxidant. As expected, the results of DNA damage showed that the increase of AA concentration leads to a reduction of DNA damage. The similar concentration dependence was observed for surface-modified TiO<sub>2</sub> NPs with AA. So, no significant differences between the antigenotoxic properties of free AA and AA attached to the TiO<sub>2</sub> NPs were noticed, but only the highest concentrations showed significant effect in both experimental treatments. Regarding short-term oxidative balance in biological material (serum), during 2h, by measuring the TAC we have showed that the complex NP and AA, so as ascorbic acid showed a significant increase in TAC capacity, compared to native serum. This increase of antioxidative capacity couldn't be abrogated even with a powerful oxidant, *tert*-butylhydroperoxide presence (TBH). After 24h hour incubation the TAC level in both samples decreased towards the baseline level. About the TOS, which measures all oxidative components in plasma such as hydrogen-peroxide and lipid hydroperoxide, the complex of NP and AA versus AA alone showed inconsistent results. Prooxidative-antioxidative balance (PAB) measuring equilibrium between oxidants and antioxidants remains low, almost imponderable after 2h and after 24h serum incubation with the two substances. To summarize, we suggest that surface-modified TiO<sub>2</sub> NPs with AA and/or similar compounds can be used to improve their bioavailability while maintaining its beneficial activities.