13th INTERNATIONAL CONGRESS OF THE SERBIAN SOCIETY OF TOXICOLOGY

&

1st TOXSEE REGIONAL CONFERENCE

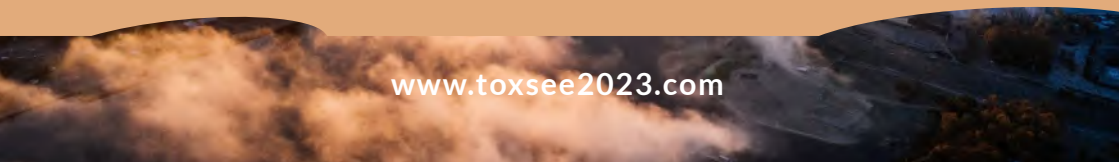
Present and Future of toxicology: Challenges and opportunities

Удружење токсиколога Србије
Serbian Society of Toxicology

10 - 12 May, 2023 Belgrade

electronic

ABSTRACT BOOK



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DEAR COLLEAGUES, DEAR FRIENDS,

We are delighted to greet you on the **13th International Congress of the Serbian Society of Toxicology & 1. TOXSEE Regional Conference - Present and Future of toxicology: challenges and opportunities**, organized in Belgrade from 10-12 May 2023.

Five years after our last international Congress we gathered in Belgrade, to further promote contemporary toxicology, in the broadest sense of meaning, as a response to the new challenges requiring innovative approaches and solutions, as it is understood in the third decade of the XXI century.

Initial concept, to blend the top scientific level in toxicology with the potentials of its' use in broad array of clinical and other domains, proved to be right. Line-up of more than 70 first class international and regional faculties as well as best Serbian scientists and toxicology professionals in all related domains fully justify the approach. Moreover, interest and presence of more than 250 colleagues from Serbia and region witness that our professional community has recognized the approach taken and shown vast interest.

The Serbian Society of Toxicology is committed to innovation and creativity in research and education, in cooperation with collegial associations and institutions in Serbia and abroad. As a regional leader, we developed and inaugurated the regional brand TOXSEE, with the idea to gather as much as possible expertise and know-how from the region and Europe, to capture knowledge, share experience and exchange practical skills with colleagues who deal with toxicology problems daily.

Time imposes on us the need to integrate science, top knowledge and daily practice in a quality and efficient way, to contribute to the better health of the society as a whole in the most purposeful manner. Therefore, a thematic and functional connections with domains of emergency medicine, general medicine, paediatrics, ecology, in addition to already standard toxicological disciplines i.e. clinical, forensic, occupational, and experimental toxicology have been enhanced.

We are glad to host you in a pleasant atmosphere of Belgrade in mid-May, to benefit from the attractive and dynamic program, exchange knowledge, and, equally important, to refresh existing and establish new contacts with colleagues and friends, while enjoying our hospitality and cherish the moment in one of the best partying cities of Europe.

YOU ARE MOST WELCOME!!!

Prof. dr Petar Bulat
- *President of the STC*
- *President of the 13th STC Congress*

Prof. dr Biljana Antonijević
- *President of the CSC of the 13th STC Congress*

Prof. dr Predrag Vukomanović
- *President of the COC of the 13th STC Congress*

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GENOTOXICOLOGY AND CARCINOGENICITY

FRANGULA ALNUS EKSTRAKT I EMODIN KAO POTENCIJALNI ANTIKANCERSKI AGENSI

Stefana Vuletić[1], Stefana Cvetković[1], Nina Tomić[2], Tea Ganić[1], Sergej Tomić[3], Marina Bekić[3], Biljana Nikolić[1], Dragana Mitić-Ćulafić[1]

1 *Univerzitet u Beogradu – Biološki fakultet, Beograd, Srbija*
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Hepatocelularni i kolorektalni karcinom se sve ćešće javlja i ima visoku stopu smrtnosti. Postojanje aktivnih mehanizama hemorezistencije otežava korisnost hemoterapije. Upravo je pojava hemorezistencije podstakla opsežna istraživanja za razvoj novih terapeutskih agenasa i strategija za lečenje ovih vrsta karcinoma.

Prirodni proizvodi biljnog porekla (sekundarni metaboliti) su bogat izvor potencijalnih lekova. Zbog toga smo u istraživanju usmerili pažnju na etil-acetatni ekstrakt biljke Frangula alnus (FA) i njegovu dominantnu komponentu emodin (E) i ispitali njihovo antikancerski potencijal na ćelijama hepatocelularnog (HepG2) i kolorektalnog (HCT116) karcinoma i citotoksičnost na normalnim MRC -5 ćelijama. Pokazan je snažan antioksidativni potencijal ekstrakta (DPPH i TBA test). Citotoksičnost ispitana MTT testom pokazala je jaku toksičnost obe supstance na ćelije HepG2 i HCT116, ali bez uticaja na MRC-5 ćelije.

Dalje je analiza ćelijskog ciklusa pokazala da su i FA i E izazvali zaustavljanje u G1 fazi i blago nakupljanje ćelija u G2/M fazi. Pored toga, obe supstance su uvele ćelije u apoptozu i nekrozu i uticale su na mitohondrijalni membranski potencijal. Dalje, izazvali su značajan genotoksični efekat u kometnom testu na svim ćelijskim linijama. Može se zaključiti da su FA i E dobri kandidati za nove antikancerogene agense prirodnog porekla. Međutim, neophodna su dodatna istraživanja, posebno kada je u pitanju citotoksična aktivnost i bezbednost primene ovih supstanci.

KLJUČNE REČI: Frangula alnus, emodin, ćelijski ciklus, mitohondrijalni membranski potencijal, genotoksičnost

FRANGULA ALNUS EXTRACT AND EMODIN AS POTENTIAL ANTICANCER AGENTS

GENOTOXICOLOGY AND CARCINOGENICITY

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Hepatocellular and colorectal carcinoma is swiftly increasing alongside a high mortality rate. The existence of active mechanisms of chemoresistance hampers the usefulness of chemotherapy. The emergence of chemoresistance encouraged extensive research to develop new therapeutic agents and strategies for the treatment of these types of cancer. Natural products of plant origin (secondary metabolites) have been the most successful source of potential drug leads. Therefore, we turned our attention to the Frangula alnus ethyl-acetate extract (FA) and its dominant constituent emodin (E) and explored them for their anticancer potential on hepatocellular (HepG2) and colorectal (HCT116) carcinoma cells, and cytotoxicity on normal MRC-5 cells.

Strong antioxidant potential of the extract was demonstrated (DPPH and TBA test). Cytotoxicity investigated by the MTT assay showed strong cell toxicity of both substances on HepG2 and HCT116 cells, but without affecting MRC-5 cells. Next, the analysis of cell cycles exhibited that both FA and E induced arrest in the G1 phase and slight accumulation of cells in the G2/M phase. In addition, both substances introduced cells into apoptosis and necrosis and modulated mitochondrial membrane potential. Further on, they caused significant genotoxic effect in comet assay applied in all cell lines. It can be concluded that FA and E are good candidates for new anticancer agents of natural origin. However, additional studies are necessary, especially when it comes to the cytotoxic activity and safety of the application of these substances.

KEYWORDS: Frangula alnus, emodin, cell cycle, mitochondrial membrane potential, genotoxicity

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