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## EFFECTS OF HIGH DOSES OF LEMON BALM (*MELISSA OFFICINALIS* L.) ESSENTIAL OIL ON MICE BEHAVIOR AND SERUM BIOCHEMICAL PARAMETERS

**Nikola Stojanovic, Dusan Sokolovic, Pavle Randjelovic, Marko Mladenovic and Niko Radulovic**

University of Niš, Serbia

**Statement of the Problem:** The essential oil of *Melissa officinalis* leaves is held in high esteem for its use in aromatherapy; however, due to the low yield of the essential oil, its production cost is very high. A myriad of beneficial biological activities of this essential oil was reported and its composition has been extensively studied. Strangely, up to date, no studies exist on the acute toxicity of this essential oil. Prompted by this, in this work, the toxicity of orally administered *M. officinalis* essential oil was assessed.

**Methodology & Theoretical Orientation:** The hydrodistilled essential oil used in the current study was obtained from fresh plant material (leaves, yield 0.087%, w/w) and the detailed analyses (GC and GC/MS) showed that the tested essential oil contained high amounts of geranial (22.1%), neral (17.6%), citronellal (4.2%), nerol (1.3%) and geraniol (1.2%), as expected for *M. officinalis* (3). The acute toxicity was evaluated in female BALB/c mice that were orally treated with the essential oil (in the dose range 0.5-3 g/kg). During a 24-h period, the animals' behavior was monitored, and after that, the survived animals were sacrificed and, in their sera, liver damage-related parameters were evaluated.

**Findings:** Doses over 1 g/kg decreased animal movement, produced abdominal writhings, tumbling, atony, spastic movements and in some cases muscle rigidity. All these symptoms were dose dependent and could probably be brought in connection with the amount of citronellal in the applied doses. Serum levels of ALT and AST, as well as their ratio (AST/ALT), increased with the applied essential oil in doses >1 g/kg, indicating liver toxicity.

**Conclusion & Significance:** In conclusion, by causing a wide panel of both behavioral alterations and changes in serum biochemical parameters in mice, *M. officinalis* essential oil can be deemed as being moderately toxic.



*Melissa officinalis*



Female BALB/c mice

### Recent Publications

1. Ajayi C O, Elujoba A A and Adepiti A O (2015) Antiplasmodial properties of *Alstonia boonei* stem-bark and *Picralima nitida* seed in different combinations. *Nigerian Journal of Natural Products and Medicines* 19:71-77.
2. Adepiti A O, Elujoba A A and Bolaji O O (2014) *In vivo* antimalarial evaluation of mama decoction on *Plasmodium berghei* in mice. *Parasitol Res.* 113:505-511.
3. Pulcini S, Staines H M, Pittman J K, Slavic K, Doerig C, et al. (2013) Expression in yeast links field polymorphisms in PfATP6 to *in vitro* artemisinin resistance and identifies new inhibitor classes. *Journal of Infectious Diseases* 208(3):468-478. Iwu M M and Klayman D L (1992) Evaluation of the *in vitro* antimalarial activity of *Picralima nitida* extracts. *Journal of Ethnopharmacology* 36(2):133-135.
4. Asuzu I U and Anaga A O (1991) Pharmacological screening of the aqueous extract of *Alstonia boonei* stem-bark. *Fitoterapia* 63:411-417

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DOI: 10.21767/2348-9502-C1-006**Biography**

Nikola Stojanovic obtained his MD Degree from the Department of Medicine (Faculty of Medicine, University of Niš, Serbia) and was awarded as the Best Graduated Student for the graduation year 2014/2015. He began his research work during the second year of his studies and he is now doing a large number of specialized *in vivo* and *in vitro* experiments in the fields of Pharmacology, Toxicology, Biology, Immunology and Microbiology. His main focus currently involves the effects of essential oils on the levels of anxiety in both humans and animals. Up to now, he had participated and won several prizes, on national and international congresses in different fields of research. Besides that, he is an Author and Coauthor of a number of publications in highly esteemed peer-reviewed journals.

nikola.st90@yahoo.com