

A large white circle containing decorative elements: two pills at the top, three flowers on the right, and a molecular structure of hexagons at the bottom right. The text is centered within the circle.

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Ladislav Kokoška
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biological activity
of Ranunculaceae
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13 de MAYO 2014 | 12:30 h. | Sala de grados "Manuel Medina"

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Professor Kokoška is Full Professor at the Faculty of Tropical AgriSciences (FTA) of the Czech University of Life Sciences Prague, where he is actively involved in both teaching and research activities. He is the head of the Ethnobotany and Ethnopharmacology Laboratory where he is focused on the study of biologically active natural products derived from underutilized tropical crops, especially from species used by native peoples in traditional folk medicinal systems. The main areas of his research interests are anti-inflammatory, antimicrobial and antioxidant agents. Prof. Kokoška is author or co-author of in an important number of monograph, chapters in monographs and scientific papers, he has participated in a significant quantity or international symposiums and has contributed to several works popularizing science. As a principal investigator or co-investigator, he has managed a good number of research projects. He is a member of various scientific societies (e.g. Society for Medicinal Plant and Natural Product Research) and editorial boards of several journals (e.g. Anti-Inflammatory & Anti-Allergy Agents in Medicinal Chemistry).



Chemistry and biological activity of essential oils of Ranunculaceae species

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The Ranunculaceae is a worldwide-distributed plant family consisting of about 2,500 species of annual to perennial herbs, shrubs, or woody climbers. Many genera such as *Aconitum*, *Delphinium*, *Helleborus* or *Trollius* are well known as cultivated ornamentals and certain species (e.g. *Cimicifuga racemosa*, *Hydrastis canadensis*, and *Nigella sativa*) are used as herbal medicines and spices. Various species belonging to the family have been important components of herbal preparations used in folk medicinal systems with ancient history of practice such as Ayurveda or traditional Chinese medicine. Nowadays, their extracts and compounds are used in pharmaceutical preparations and dietary supplements. Despite the worldwide medicinal use of Ranunculaceae species, the pharmacological potential of their essential oils has not been fully explored yet. Therefore, we decided to submit various plant materials to the process of hydrodistillation, which led to the isolation of essential oils from seeds of *Consolida regalis*, *Delphinium elatum*, *Nigella arvensis*, *N. damascena*, *N. hispanica*, *N. nigellastrum*, *N. orientalis*, and *N. sativa*. The results of subsequent chemical analyses suggested chemotaxonomical relationships within the representatives of the genera *Consolida*, *Delphinium*, and *Nigella*. The antimicrobial screening of isolated essential oils showed that only *N. sativa* produced certain growth-inhibitory effect on microorganisms tested. Series of following experiments confirmed significant influence of four different extraction methods on the antimicrobial activity and chemical composition of *N. sativa* seed essential oil, whereas thymoquinone has been identified as the main constituent responsible for antimicrobial action of the plant. In series of subsequent experiments we also described anti-inflammatory and antioxidative effects of this compound. As a result of comparative analysis of *N. sativa* seeds and various plant parts of Asteraceae, Cupressaceae and Lamiaceae species, we finally identified *Monarda didyma* as a new prospective plant source of thymoquinone. In summary, we suggest that these findings may be used by food or pharmaceutical industry for development of new herbal-based food supplements or phytopharmaceutical preparations. Our results also contributed to better understanding of the chemotaxonomical relationships within the family Ranunculaceae.