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Baccharis dracunculifolia extract modulates oxygen-dependent and -independent mechanisms of neutrophil activation and exhibits biological stability

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Introduction: Neutrophils (PMNs) play an essential role in the defense of the organism against invading microorganisms throughout oxygen-dependent mechanisms (such as the generation of reactive oxygen species - ROS) and oxygen-independent mechanisms (such as degranulation). Despite of the benefits, excessive discharges of the ROS and the granular content can result in tissue damage, which are involved in the pathogenesis of several inflammatory diseases. Therefore, many research groups are trying to find new compounds to reduce excessive neutrophil activation and thus, modulate the inflammatory process. *Baccharis dracunculifolia* D.C. (Asteraceae), a native plant from Brazil and the most important botanical source of Southeastern Brazilian propolis (known as green propolis), is used in Brazilian folk medicine to treat inflammatory injuries. **Objective:** Evaluation of the modulatory effect of *B. dracunculifolia* extract on the degranulation and on the ROS generation by opsonized zimosan-stimulated neutrophils. Additionally, the biological stability of this extract was tested. **Methods:** The effect of the extract on ROS generation was evaluated through luminol and lucigenin-enhanced chemiluminescence assays (lumCL and lucCL respectively), whereas the degranulation was measured by assessing the extracellular activity of elastase enzyme (which is located within the granules of neutrophils and is released during the degranulation). The biological stability of *B. dracunculifolia* extract was evaluated through lumCL and lucCL after four years of storage of the extract or its plant material in appropriate conditions. **Results:** The *B. dracunculifolia* extract inhibited the degranulation and the ROS generation in a concentration-dependent manner with IC_{50} values of 25,87 ± 4,1 µg/mL for degranulation and 10,08 ± 3,2 µg/mL and 5,83 ± 1,5 µg/mL for lumCL and lucCL respectively. The evaluation of biological stability showed that the extract retains the antioxidant activity for about four years when stored under appropriate conditions. **Conclusion:** The *B. dracunculifolia* extract presented higher modulation for the oxidative metabolism of neutrophils than for the degranulation process. These results highlight the importance of the study of natural compounds in order to contribute to the development of a Brazilian therapeutic agent with significant stability and biological activity.

Keywords: *Baccharis dracunculifolia*, neutrophils, reactive oxygen species, degranulation, elastase, biological stability

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