Hemolytic activity of the essential oil from aerial parts of Vernonia chalybaea Mart. ex DC. (Asteraceae)

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Introduction: In Brazil, with little or no evidence of their pharmacological properties, medicinal plants are consumed and widespread by commerce and users, without due concern for toxicity, which is a serious public health problem. V. chalybaea Mart. ex DC. is an endemic species in Brazil with distribution in the southeast and northeast of the country, especially in regions of Caatinga (shrublands) and rocky grasslands, found in the state of Ceará particularly along the coastal plain. Known commonly as "cheira-bode?", "balaio? or "vassourinha?", it is used to treat edema and liver disease in Brazilian folk medicine. This study aimed to evaluate the toxic effect of essential oil of Vernonia chalybaea by testing toxicity of hemolytic activity. Materials and Methods: The plant material was collected in the Meruoca mountain region, Sobral, Ceará state, Brazil and the essential oil was extracted by hydrodistillation method, using Clevenger-type apparatus for a period of 2 h. In the hemolytic assay fresh blood (10 mL) was collected in EDTA tubes and centrifuged, after plasma removal, the pellet containing the Red Blood Cells (RBCs) was washed five times with phosphate-buffered saline (PBS) and, then, re-suspended in PBS to obtain an 8% (v/v) suspension. 100 µL of this suspension was added to different microcentrifuge tubes with 100 µL of 2-fold serially diluted of essential oil, ranging from 0.005 to 2.5 mg/mL. Final concentrations were: 4% (v/v) erythrocyte suspension, and 0.1-100 µM essential oil concentration range. These resulting suspensions were incubated with agitation of 60 min at 37 °C. After the incubation time, samples were centrifuged for 2 min at 1000 rpm. The supernatants were transferred to 96-well plates and the hemoglobin release was measured by absorbance at 540 nm, using the Biotek Synergy HT multiplate reader. Results and Discussion: The tests showed that at concentrations 0.039, 0.078, 0.156, 0.312, 0.625, 1.25 and 2.5 mg/mL the percentage of hemolysis ranged from 0.1% to 4.89%. Based on these results, we can extrapolate hemolysis values and estimate the IC50 of 69.01 mg/mL for the essential oil. Regarding hemolytic activity, the statistical analysis showed a significant difference at the level p = 0.05 when compared to the positive control Triton X-100 with the essential oil concentrations used. Conclusion: The essential oil of Vernonia chalybaea showed low hemolytic activity in the investigated concentrations. Therefore, the essential oil showed low cytotoxic action according to the test of hemolytic activity. This result is
promising and can be guiding for future studies of pharmacological activities of the essential oil of V. chalybaea, as well as fundamental in innovation studies and drug development.