Comparative study on antibacterial and cytotoxic properties of selected Kalanchoe species

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Abstract
Kalanchoe species belong to Crassulaceae family and are widely distributed in tropical and subtropical areas as well as commonly cultivated as household plants. Many of these species have valuable medicinal properties - anti-inflammatory, antibacterial, antiviral, antioxidant and anticancer. The main secondary compounds responsible for these effects of Kalanchoe plants are flavonoids and bufadienolides. In our study, we evaluated and compared the antimicrobial and cytotoxic activity of three Kalanchoe species – K. daigremontiana Raym.-Hamet & H. Perrier, K. pinnata (Lam.) Pers. and K. blossfeldiana Poelln. The water and ethanolic Kalanchoe extracts were prepared from fresh leaves of the species. The extracts were tested on a few bacteria stains (β-hemolytic Streptococcus, Corynebacterium diphteriae, Staphylococcus aureus, Staphylococcus epidermidis, Enterococcus hirae, and Escherichia coli). In cytotoxicity assay in vitro, we used human cancer cell lines – cervical HeLa, breast MCF-7, ovarian SKOV-3, and melanoma A375. Evaluation of the antiproliferative effect of Kalanchoe extracts was done with Real-Time xCELLigence system which enables real-time monitoring of cell growth, viability and proliferation at every point of the experiment. Our results indicate that the strongest antibacterial effects had ethanol extract of K. blossfeldiana and K. pinnata on S. aureus, S. epidermidis, and E. hirae. The most potent cytotoxic activity we observed for K. blossfeldiana ethanol extract and K. daigremontiana water extract on HeLa and SKOV-3 cells. Kalanchoe blossfeldiana ethanol extract can be a valuable candidate in infectious and cancer treatment.

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Speaker Publications:
1. “Real-time cell analysis system in cytotoxicity applications: Usefulness and comparison with tetrazolium salt assays”; Toxicology Reports/Volume 7
3. “Biological activities of leaf extracts from selected Kalanchoe species and their relationship with bufadienolides content”; Pharmaceutical Biology/Volume58/Issue 1
4. “Alpha-Hederin, the Active Saponin of Nigella sativa, as an Anticancer Agent Inducing Apoptosis in the SKOV-3 Cell Line”; Molecules/Volume 24/Issue 16
5. “Kalanchoe blossfeldiana Extract Induces Cell Cycle Arrest and Necrosis in Human Cervical Cancer Cells”; Pharmacognosy Magazine/ Volume 15/Issue 66

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