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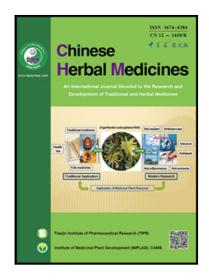
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#### ACCEPTED MANUSCRIPT

# Original article

## Chemical Constituents from Kalanchoe hybrida and their Cytotoxicity

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#### ABSTRACT

**Objective** *Kalanchoe hybrida* (Crassulaceae) is naturalized throughout all the island of Taiwan, China. The preliminary bioassay-guided fractionation of the crude extract of *K. hybrida* exhibited that the chloroform and *n*-butanol fractions possessed potent cytotoxicity against MCF-7, NCI-H460, and SF-268 tumor cell lines at 50 μg/mL concentration. Therefore, *K. hybrida* was selected as a target and the chemical constituents from the chloroform and *n*-butanol fractions of the crude extracts of *K. hybrida* were identified. The potential constituents were examined for their cytotoxicity against the tumor cell lines. **Methods** A combination of conventional chromatographic techniques was performed on the crude extract of *K. hybrida*. The chemical structures of the purified constituents were identified on the basis of spectroscopic and spectrometric analysis. **Results** The purification results had led to the characterization of totally 37 compounds. The isolated compounds 1, 2, and 4-12 were examined for their cytotoxicity *in vitro*, and bufadienolides 4-8 and flavonol glycoside 11 displayed significant cytotoxicity towards all the tested tumor cell lines among these tested compounds. **Conclusion** The results indicated that these principles should be responsible for the bioactivity of corresponding partial fractions. The potential constituents could be further investigated to explore the new natural lead drugs.

### Key words

bufadienolide; Crassulaceae; cytotoxicity; flavonol glycoside; Kalanchoe hybrida (J. D. Hooker) Vilmorin

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1. Introduction

Kalanchoe genus is a widespread distributed ornamental and medicinal plant around the world. Among this genus, K. pinnata, K. daigremontiana, K. gracilis, and K. hybrida were reported to display

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