Chelidonium majus L contém: protopine, chelidonine, coptisine, sanguinarine, berberine allocryptopine, chelerythrine e stylopine, flavonóides, ácidos fenólicos

**Anticancer Activity**

*In vitro studies:* Different alkaloids of *C. majus* have the following activities that might be responsible for its anticancer effect: (a) reduced telomerase activity by chelidonine [40]; (b) cancer cell death by apoptosis [40–42], and blister cell death [42]; (c) arrest of mitosis by inhibition [40]. Several studies suggest that Ukrain® (an anticancer drug whose major components are *C. majus* alkaloids chelidonine, sanguinarine, chelerythrine, protopine, and allocryptine) [41] exerts multiple selective effects on cancer cells: (a) cytotoxic effects on cancer cells without negative effects on normal cells [43]; (b) radio-sensitising effects on cancer cells, but radio-protective effects on normal cells [44].

*Animal studies:* *C. majus* extract has exerted inhibitory activity on glandular stomach carcinogenesis in rats treated with N-methyl-N'-nitro-N-nitrosoguanidine (MNNG) and hypertonic sodium chloride [45].

*Human clinical studies:* Some clinical studies suggest beneficial effects of Ukrain in the treatment of patients suffering from bladder, breast, pancreatic, rectal, colorectal cancer, or Kaposi’s sarcoma with even less adverse reactions when compared with conventional antineoplastic drugs. However, independent rigorous clinical studies and larger sample sizes are required before positive recommendations can be issued [46–49].

**Hypothesis:** According to Chinese medicine, blood stasis, pathogenic heat, and static phlegm are the principal causes for most cases of cancer pathogenesis [50]. Blood stasis is assumed to produce an accumulation of heat. An accumulation of excessive fluids followed by stasis and heat thickens the dampness which becomes sticky and turns into phlegm. The anticancerous potential of *C. majus* according to Chinese medicine is due to its multiple activities: elimination of blood stasis (antithrombotic, anti-inflammatory effect) and clearing the pathogenic heat (anti-inflammatory effect), and prevention of an accumulation of body fluids. *Forsch Komplementmed.* 2010 Oct;17(5):241-8.

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Capillary electrophoresis with LED-induced native fluorescence detection for determination of isoquinoline alkaloids and their cytotoxicity in extracts of *Chelidonium majus* L.

Kulp M, Bragina O, Kogerman P, Kaljurand M.
Abstract

In this study, we introduced a simple and sensitive method of capillary electrophoresis with ultraviolet light-emitting diode-induced native fluorescence (UV-LEDIF) detection for the determination of isoquinoline alkaloids in extracts of Chelidonium majus L. Samples were extracted with acidic methanol and the extracts were directly analysed by CE. Simultaneous determination of protopine, chelidonine, coptisine, sanguinarine, allocryptopine, chelerythrine and stylopine was performed in 20mM phosphate buffer (pH 3.1). The baseline separation of these alkaloids was finished within 20 min. As these alkaloids have native fluorescence, they were directly detected using the commercially available UV light emitting diode without troublesome fluorescent derivatisation. Satisfactory LOD values were obtained for the studied compounds considering their appearance in natural extracts. Lower limits of detection were 0.05 μg/mL for protopine, 0.06 μg/mL for stylopine and allocryptopine, 0.07 μg/mL for chelidonine, 0.22 μg/mL for sanguinarine, 1.7 μg/mL for chelerythrine and 5.5 μg/mL for coptisine. The developed method was successfully applied to determine the contents of seven alkaloids in the aerial parts of Chelidonium majus L, which varied from 0.025 to 0.763% (w/w). Also, to demonstrate the potential of the proposed CE method, an estimation of the cytotoxic properties of selected Celandine alkaloids in a natural extract was carried out.

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Simultaneous determination of seven main alkaloids of Chelidonium majus L. by ultra-performance LC with photodiode-array detection.


Source

Jiangsu Key Laboratory for TCM Formulae Research, Nanjing University of Chinese Medicine, Nanjing, PR China.
Abstract

A simple and rapid method for the simultaneous determination of seven isoquinoline alkaloids, protopine, chelidonine, coptisine, stylopine, sanguinarine, berberine, and chelerythrine, in Chelidonium majus L. (Ch. majus) samples by ultra-performance LC method with photodiode array detection is described. The baseline separation of these compounds was performed with (A) acetonitrile-(B) ammonium acetate (10 mM, adjusted to pH 3.0 with acetic acid) as the mobile phase using a C18 RP column (2.1x100 mm, 1.7 microm). Optimized conditions resulted in excellent peak shapes. The seven alkaloids were completely separated within 20 min. Good linear behaviors (r > or = 0.9992) over the investigated concentration ranges were observed for all the analytes. Validation proved the repeatability of the method was good and recovery was satisfactory. The validated method was successfully applied for 20 batches of Ch. majus. These results demonstrated that the ultra-performance LC photodiode array method proposed was very useful in the analysis and quality control of Ch. majus.

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