Antiproliferative activity of essential oil of *Mentha cordifolia* on human carcinoma cells

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Introduction

Natural products have been investigated for the potential anticancer agents. The extracts of *Mentha piperita* and *Mentha aquatica* [1-3], and essential oils of *Mentha arvensis* and *Mentha spicata* [4], have been reported to be suppressive to human cancer cells. In this study, the essential oil of *Mentha cordifolia* was evaluated for antiproliferative activity in KB and HeLa carcinoma cells.

Methods

*Mentha cordifolia*: The leaves of *Mentha cordifolia* was collected at the experimental garden of the Faculty of Pharmacy, Srinakharinwirot University, Ongkharak, Nakhonnayok, Thailand in June 2010.

Essential oil extraction: Water distillation of 1,000 g of fresh leaves was used for extraction of the essential oil at room temperature for 2 h. The obtained essential oil was incubated with anhydrous sodium sulfate and stored at -20°C until used.

Cell lines: HeLa and KB cells were each grown in MEM medium (Invitrogen, Grand Island, NY) supplemented with 10% FBS, 100 μg/mL streptomycin 100 U/mL penicillin and 1% amphotericin B, and maintained at 37°C in 5% CO₂ and 95% humidity.

Antiproliferative activity assay: KB and HeLa cells were each plated in 96-well plates at a density of 5×10³ and 1×10⁴ cells/well, respectively, and allowed to incubate in growth medium for 16-18 h. After incubation, the cells were treated with various dilutions of the essential oil (1-10,000 μg/mL) for 72 h at 37°C in 5% CO₂ and 95% humidity. Untreated cells were used as a control. Cells treated with 1 μM doxorubicin were used as a marker. After treatment, the cell viability was determined by MTT assay.

Statistical analysis: Differences were statistically examined using one-way analysis of variance (ANOVA) followed by an LSD post hoc test. A p < 0.05 was considered to be significant.

Results

Oil yield and physical aspect: The yield of *Mentha cordifolia* essential was 0.08% based fresh weight of material. The extracted essential oil was clear with a density of 0.782 mg/mL.

Antiproliferative activity: The essential oil showed significant antiproliferative activity against the cell lines used in the study (Figure 1) with IC₅₀ values of 195.3±45.3 and 33.7±3.2 μg/mL, in KB and HeLa cells, respectively.
Figure 1. Antiproliferative activity of the essential oil of *Mentha cordifolia* in KB (a) and HeLa cell line (b). Dox: doxorubicin. The significance (*) was set at the level of 0.05.
**Discussion**
Several plant essential oils have been demonstrated to be suppressive to human cancer cells [4-7]. Our study showed that *Mentha cordifolia* essential oil had antiproliferative activity in KB and HeLa carcinoma cells.

**Conclusion**
The essential oil of *Mentha cordifolia* had inhibitory of growth in KB and HeLa human carcinoma cells in concentration-dependent pattern.

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**References**