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# ANTICANCER ACTIVITY OF ALLIUM COMMUTATUM, ALLIUM SATIVUM, AND LEPIDIUM GRAMINIFOLIUM ON HUMAN CANCER CELL LINES

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The anticancer activity of volatile isolates from *Allium commutatum Guss., Allium sativum L. (Amaryllidaceae family),* and *Lepidium graminifolium L.* ssp. *graminifolium* (*Brassicaceae* family), analyzed by GC-MS, as well as the pure sulfur volatiles, were evaluated against two human tumor cell lines: glioblastoma cell line LN-229 and bladder cancer cell line UM-UC-3, using MTT assay. The major sulfur volatiles found in A. *commutatum* hydrodistillate from flower and A. *sativum* bulb originated from S-alk(en)yl cysteine sulfoxide degradation. The most abundant sulfur volatile in A. *commutatum* isolate was dipropyl trisulfide, and in A. *sativum* diallyl disulfide. A. *commutatum* distillate showed very weak cytotoxic effect on both cancer cell lines except at incubation time of 72 h on LN229 cell line ($IC_{50}$ 6.364 µg/mL), while dipropyl trisulfide showed much stronger cytotoxic effect: with $IC_{50}$ 12.34 and 10.35 µg/mL, and $IC_{50}$ 22.19 and 8.434 µg/mL for UM-UC-3 and LN229 cell line, respectively during incubation time of 48 and 72 h. Both A. *sativum* extract and distillate showed strong time and concentration-dependent cytotoxic activity on both cancer cell lines, with the best results at incubation time of 48 and 72 h. A. *sativum* extract had $IC_{50}$ 14.49 and 12.48 µg/mL, and 40.84 and 10.41 µg/mL for UM-UC-3, and for LN229 cell lines, respectively, during incubation time of 48 and 72 h. A. *sativum* distillate showed very similar results: $IC_{50}$ 20.86 and 14.13 µg/mL, and 17.41 and 12.01 µg/mL for UM-UC-3, and for LN229 cell line, respectively. As expected, an active compound from A. *sativum* diallyl disulfide showed very strong anticancerogenic potential with $IC_{50}$ 22.3 and 19.07 µg/mL, and 44.69 and 8.85 µg/mL for UM-UC-3, and LN229 cell line, respectively. L. *graminifolium* extract and distillate sulfur volatiles originated from glucosinolates degradation i.e. 3-methoxybenzyl isothiocyanate, and benzyl isothiocyanate. They didn't show strong cytotoxic activity on UM-UC-2 cell lines. While there was effect on LN229 cell line of distillate at incubation time of 48 hours ($IC_{50}$ 53.92 µg/mL) and of extract at incubation time of 48 and 72 hours ($IC_{50}$ 30.71 and 54.37 µg/mL, respectively). On the contrary, benzyl isothiocyanate showed much stronger cytotoxic effect: with $IC_{50}$ 13.16 and 12.3 µg/mL, and $IC_{50}$ 6.48 and 12.29 µg/mL for UM-UC-3, and LN229 cell line, respectively during incubation time of 48 and 72 h.

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