

Evaluation of *Allium* Vegetables for Anti-Adipogenic, Anti-Cancer, and Anti-Inflammatory Activities *In Vitro*

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ABSTRACT *Allium* vegetables include onions, garlic, and leeks that are used all over the world in different cuisines. We evaluate anti-cancer, anti-obesity, anti-inflammation of nine *Allium* vegetables. Most the extracts from nine *Allium* vegetables decreased breast cancer cell viability compared to the untreated cells. The order of the anti-cell growth effects of the extracts at a concentration of 100µg/mL for 72h was as follows: *Allium tuberosum* ≥ *Allium macrostemon* > *Allium thumbergii*. The *Allium* vegetables were able to inhibit MDA-MB-453 cancer cell proliferation. Some of the *Allium* vegetable extracts increased caspase-3 activity compared to the control. Caspase-3 activity levels in cell treated with 100µg/mL of *Allium tuberosum*, *Allium macrostemon*, and *Allium thumbergii* were 52.1, 46.2 and 41.3%, respectively. To test whether *Allium* vegetables have anti-obesity effects, we investigated the effects of vegetable extracts on differentiation of preadipocyte 3T3-L1 cells. Most of the tested extracts exhibited anti-adipogenic effects at a concentration of 100µg/mL. *Allium tuberosum*, *Allium macrostemon*, and *Allium thumbergii*, which have anti-cancer effects, also inhibited lipid accumulation by 45.6, 57.0, and 64.9 %, respectively, at a concentration of 100µg/mL. However, no effects of the vegetables on lipolysis in adipocytes were observed. For anti-inflammatory effects, no effects of all *Allium* vegetables on nitric oxide (NO) production in lipopolysaccharide (LPS)-induced macrophage cells. These findings indicate that *Allium* vegetables do not affect NO-mediated inflammatory responses. Taken together, our study demonstrated that *Allium* vegetables may be useful as a functional food material for regulating cancer and lipid accumulation.