

## **The nature of the synergistic actions between medicinally active constituents in sour cherry (*Prunus cerasus* L)**

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The levels of anthocyanins and other flavonoids, as well as melatonin in various sour cherry products (frozen and dried cherries, individually quick frozen (IQF) cherry powders and juice concentrates) from two cherry cultivars, namely, Montmorency and Balaton were comparatively analyzed by HPLC and Mass Spectrometry (MS) techniques. Our results show that the major anthocyanin compound in Balaton and Montmorency cherries is cyanidin 3-glucosylrutinoside, followed by cyanidin 3-rutinoside, cyanidin sophoroside, and peonidin 3-glucoside. The other major flavonoid compounds are quercetin and isorhamnetin rutinoside. All cherry products analyzed have substantial amounts of total anthocyanins and total phenolics.

In addition, in the present study, the nature of positive interactions was analyzed through reconstitution experiments in which the antioxidant effects of interacting compounds are measured. We have compared the antioxidant activities of several cherry product crude extracts as well as performed the antioxidant assays with each of the chosen active constituents separately and in various combined amounts that are present in sour cherry. When measured separately, we have observed that standard compounds with common aglycon moieties show similar antioxidant activities. The isobolographic analysis revealed that two potentially active constituents, kaempferol and melatonin, when mixed in ratios 2:1, act synergistically to impact oxidative stress. Results of this study identify the primary sour cherry constituents that contribute to the observed pharmacological effects; decipher which ones may act synergistically or additively; and suggest the amounts most efficacious for usage.

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