

The anti-proliferative and anti-invasive effect of leaf extracts of blueberry plants treated with methyl jasmonate on human gastric cancer in vitro is related to their antioxidant properties

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Gastric cancer is the third main cause of cancerous tumors in humans in Chile. It is well accepted that a diet rich in antioxidant plants could help in fighting cancer. Blueberry is a fruit crop with a high content of antioxidants. Methyl jasmonate (MeJA) is a phytohormone involved in plant defenses under stress conditions. The exogenous application of MeJA can improve the antioxidant properties in plants. We studied in vitro and in vivo anticancer action on human gastric cancer (cell line AGS) and the antioxidant properties of extracts from blueberry plants untreated and treated with MeJA. The results demonstrated that leaf extracts displayed a higher inhibition of cancer cell viability as well as greater antioxidant properties compared to fruit extracts. Besides, MeJA applications to plants improved the antioxidant properties of leaf extracts (mainly anthocyanins), increasing their inhibition levels on cell viability and migration. It is noteworthy that leaf extract from MeJA-treated plants significantly decreased cancer cell migration and expression of gastric cancer-related proteins, mainly related to the mitogen-activating protein kinase (MAPK) pathway. Interestingly, in all cases the anticancer and antioxidant properties of leaf extracts were strongly related. Despite highlighted outcomes, in vivo results did not indicate significant differences in *Helicobacter pylori* colonization nor inflammation levels in Mongolian gerbils unfed and fed with blueberry leaf extract.

Our findings demonstrated that MeJA increased antioxidant compounds, mainly anthocyanins, and decreased the viability and migration capacity of AGS cells. In addition, leaf extracts from MeJA-treated plants were also able to decrease the expression of gastric cancer-related proteins. Our outcomes also revealed that the anthocyanin-rich fraction of blueberry leaf extracts showed higher in vitro antiproliferative and anti-invasive effects than the crude leaf extracts. However, it is still uncertain whether the leaf extracts rich in anthocyanins of blueberry plants are capable of exerting a chemopreventive or chemoprotective effect against gastric cancer on an in vivo model. © 2020 by the authors. Licensee MDPI, Basel, Switzerland.

Anticarcinogenic

Antioxidants

Blueberry

Gastric cancer

Methyl jasmonate

Phenols