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Biomedical activities of anthocyanin extract derived from the *Solanum tuberosum* L. Vitelotte

Paola Bontempo
University of Luigi Vanvitelli Campania Studies, Italy

Epidemiological analyses suggest that individuals consuming a diet rich in fruits and vegetables have a reduced risk of developing non-communicable diseases such as cancer. *Solanum tuberosum* L. var. Vitelotte is a potato variety with deep blue skin and violet flesh widely used for human consumption and well appreciated for its good nutritional characteristics. The pigments responsible for its attractive color belong to the class of anthocyanins. The purpose of this study was to analyze the biomedical activities of anthocyanins extract derived from the *Solanum tuberosum*. The main objectives were to characterize and measure the concentration of anthocyanins in pigmented potatoes, and to evaluate their antioxidant, antimicrobial activities and their anti-proliferative effects in solid and hematological cancer cell lines. Molecular genotyping was performed to properly identify this outstanding genotype in comparison to other potato varieties and to promote the utilization of this genetic resource by plant breeders. Anthocyanins exert anti-bacterial activity against different bacterial strains and a slight activity against three fungal strains. The Gram-positive bacterium *Staphylococcus aureus* and the fungus *Rhyzoctonia solani* were the most affected microorganisms. Antioxidant activities were evaluated by DPPH and FRAP methods; the extract showed a higher reducing capability than anti-radical activity. In different cancer cell models, the anthocyanins cause inhibition of proliferation and apoptosis in a dose dependent manner. Furthermore, cellular and molecular characterization of the action of anthocyanin extract in cancer cells revealed that modulation of cell cycle regulators occurs upon treatment. As well as inducing apoptotic players such as TRAIL in cancer systems, anthocyanin extract inhibited Akt-mTOR signaling, thereby inducing maturation of acute myeloid leukemia cells. These biological activities are likely due to the high content of malvidin 3-O-p-coumaroyl-rutinoside-5-O-glucoside and petunidin 3-O-p-coumaroyl-rutinoside-5-O-glucoside. These results are of interest in view of the impact on food consumption and as functional food components on potential cancer treatment and prevention.

Biography

Paola Bontempo has completed Medical Education in Medicine and Surgery in 1991 from University of Naples Federico II. She obtained license to practice medicine in 1991. In 1997, she did a specialization in Clinical Pathology at Second University of Naples. In 2003, she completed PhD in Cellular and Molecular Pathology from University of Naples Federico II. In 2004, she joined as Researcher in the Department of General Pathology at Second University of Naples. From 2005 till date, she is working as Aggregate Professor in the Department of Biochemistry, Biophysics and General Pathology, Second University of Naples. She currently teaches Clinical Pathology and General Pathology at the Second University of Naples Medical School. She is actively involved in studies concerning the mechanism(s) of proliferation, differentiation and apoptosis induced by steroid hormones, epigenetic modulators and natural compounds in cancer systems.

paola.bontempo@unina2.it

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