Proceedings of the LXVI SIGA Annual Congress
Bari, 5/8 September, 2023
ISBN: **978-88-944843-4-2**

Poster Communication Abstract – 1.66

CHARACTERIZATION OF MAIZE ROOT CULTURE FOR THE PRODUCTION OF NUTRACEUTICAL COMPOUNDS

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anthocyanins, pigmented maize, bioactive compounds, roots, in vitro culture

Anthocyanins are an important group of water-soluble pigments present in most vascular plants, belonging to flavonoids, major group of plant secondary metabolites. They are responsible for tissue pigmentation such as orange, red, purple and blue of most flowers, fruits, seeds and other vegetative tissues, thereby enhancing their chances of successful pollination and seed dispersal. These colouring pigments protect plants from harmful UV radiation, act as antioxidants to combat oxidative stress, respond to environmental stress, and defend against pathogens and herbivores. In recent years, anthocyanins have acquired great interest thanks to their bioactive properties. Indeed, several studies have linked these compounds with an important role in human health due to their antioxidant and anti-inflammatory properties, effects on cardiovascular health and anticancer characteristics. Among plants, pigmented maize varieties are particularly rich in anthocyanins, with an average content much higher than that found in other plants such as blueberries, chokeberry, and strawberry, known to be particularly rich in these secondary metabolites. For this reason, because of their healthy properties, several researches are focusing on generating new-pigmented maize varieties that are suitable for cultivation and useful for the production of healthy foods. An alternative approach for anthocyanin production is based on the use of *in vitro* tissue cultures. Indeed, this strategy, together with biotechnological approaches, makes possible a sustainable agricultural development, ensuring solutions to important food safety issues. In this study, *in vitro* root tissue cultures were developed, evaluating the effect of several factors (concentration of growth regulators, sucrose, presence/absence of light and genotype) on anthocyanin production and accumulation. Surprisingly, when compared to cob tissue,

which is considered one of the most anthocyanin-rich maize tissues, the total content of anthocyanins in roots is more than doubled (19.58 mg/g vs 8.61 mg/g respectively). Results obtained are encouraging and highlight the possibility of using this tissue as starting material for the production of these bioactive compounds. Moreover, the application of *in vitro* technologies, offers several advantages compared to conventional plant cultivation methods, overcoming limitations due to plant growing slowness, season dependency and contaminations.

Acknowledgements

sPATIALS3 project is financed by the European Regional Development Fund under the ROP of the Lombardy Region ERDF 2014-2020 - Axis I "Strengthen technological research, development and innovation" - Action 1.b.1.3 "Support for co-operative R&D activities to develop new sustainable technologies, products and services" - Call Hub

Nutrage project funded by CNR project FOE-2021 DBA.AD005.225