Quality assessment in wild strawberry fruit and basil leaf from plants cultivated on dredged remediated sediment" (LIFE SUBSED 17 ENV/IT/000347)

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Introduction: Soilless plant production is a method applied worldwide by the horticulture and nursery industry that offers economic and practical advantages. Nevertheless, soilless cultivation is facing an important concern about the use of peat, which is the most adopted component for professional and hobby use. Peat is provided with a number of physicochemical properties, which has made it as almost irreplaceable by other materials. However, due to an increased demand for this material, peatlands are depleting, resulting in rising costs for peat and generating doubts about availability of this material in the near future. It is increasingly necessary to identify and study new substrates that make it possible to reduce, or even replace, the use of peat in agriculture. Millions of cubic meters of sediments are necessarily dredged annually from ports, harbors and waterways for enhancing commercial shipping and flood management. A big part of this volume is not inevitably a waste, if properly decontaminated. Among the remediation technologies available today for sediment decontamination, phytoremediation and landfarming have been previously proven to be successful in reducing the level of pollutants and increasing both physical and chemical fertility of the dredged material [1;2]. Thus, phytoremediated and landfarmed sediment was reused as plant substrate for the cultivation of wild strawberry and basil plants.

Methods: Remediated and landfarmed sediment was used alone or mixed with different proportions of a peat-based commercial substrate for the cultivation of *Fragaria vesca* L. cultivar Regina delle Valli and *Ocinum basilicum* L. cultivars Valentino and Genova. Certified wild strawberry plants were planted in 50-litres plastic plant-boxes, while basil seeds were sown in a 0.5-liter plastic square pots containing the chosen mixtures. Both trials were performed under greenhouse condition and different water regimes were applied throughout each growing cycle. At harvest stage, plants were collected for evaluating the following parameters: plant height, leaf area, leaf blade color and chlorophyll content. Strawberry plant productivity was monitored and counted when fruits were considered "marketable" for determining the total fruit yield over the experimental period. Depending on the plant species, organoleptic quality of the food products was evaluated by analyzing several nutritional and nutraceutical parameters: total polyphenols, total anthocyanins, antioxidant activity, vitamin C, sugars, organic acids, and essential oil content. Besides, plant samples were used for assessing food safety trough the scanning of heavy metal and organic pollutants according to official protocols for food risk characterization.

Results: No significant differences among the substrates were observed for wild strawberry productivity, even if fruits harvested from plant cultivated on peat-based growing medium displayed slightly higher fresh and dry weight values compared to those grown on sediment-based media. As for pomological parameters, total solid soluble and titratable acidity, were found to be significantly higher in fruit obtained on sediment-based media. The best basil germination performances were obtained with the substrates made from mixture of sediment/peat (50:50 *v/v*). Basil germination was significantly influenced by the water regime, resulting in a greater rate when seedlings were irrigated with the highest water level.

Discussion: Basil and wild strawberry were chosen as model plant species since they are good indicators of the chemical and physical quality of the tested substrates. Plants did not show any visible phytotoxic symptoms or damages. This aspect is being corroborated with next specific analysis on leaves and fruits. These preliminary findings highlighted a positive effect of the sediment-based media on growth and yield as well as on the nutraceutical and sensorial quality of the edible product.

References: [1] Masciandaro et al. (2014) *J Environ Manage* **134**: 166-174; [2] Tozzi et al. (2020) *Chemosphere* **238**: 124651.

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