

Agricultural Wastes Pelletized with Elemental Sulfur and Bentonite increase health-benefiting phytonutrients in red onion

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Abstract

In this study, we used efficient S-enriched organic fertilizers produced with crude orange or olive wastes linked to bentonite to improve the productivity and quality of red onion. This vegetable is popular in cuisines worldwide and is valued for its potential medicinal properties. Red onion is an important source of several phytonutrients as flavonoids, thiosulphinates and other sulphur compounds, recognized as important elements of the Mediterranean diet. The experiment was conducted in a controlled environment, glasshouse for 3 months, in plastic pots to measure the growth parameters and phytochemicals of differently treated red onion. Our results evidenced that amended plant grew better than control. The antioxidant activity detected as DPPH, ORAC and ABTS was the highest in presence of S-enriched organic fertilizers. Polyphenols, increased in all treated plants. In regards the investigation of onion volatile compounds the volatile fraction was clearly dominated by sulphur compounds that are strictly related to the concentration of the aroma precursors S-alkenyl cysteine sulfoxides (ACSOs). The greater amount of thiosulphinates in treated compared to untreated onion evidenced that S-bentonite pelletized with recalcitrant agricultural wastes can represent a new formulation of organic fertilizer able to improve the beneficial properties of onion extract. Our results showed also that red onion had the best growth and quality in presence of S-bentonite bound with crude orange. Conclusively, the use of sulphur-bentonite bound with recalcitrant agricultural wastes produce high quality onion plants that can be used for pharmaceutical purposes.

Bioraphy

Muscolo Adele graduated in Biological Sciences (MSc), has completed her PhD in Food Science at the age of 26 years at the Policlinic Federico II University of Naples, Italy. In 1988 she started is professional carrier as researcher at “Mediterranea” University of Reggio Calabria where she is still working as Full Professor in soil chemistry and ecology. Since 1990 she is reviewer for International Scientific Journals and since 2008 she is evaluator of projects for European Community, International Funding Research Agencies and Italian and Foreign Research Ministries. She is examiner of international PhD dissertation. She has over 180 papers in international journals

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