Identification and Investigation of terrestrial/ freshwater algal specie with adaptive mechanisms to Cr(VI) stress

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Sulfate metabolism plays a central role in enhancing cell defense to abiotic stresses and on the onset of tolerance mechanisms toward heavy metals, chromium included. Sulfur-containing molecules such cysteine (cys) and reduced glutathione (GSH) have an important role in scavenging during oxidative stress leading to a phenomenon, known as SED (Sulfur Enhanced Defense). These molecules are directly involved in chelating various metal ions, Cr(VI) included, and in reducing metal-induced oxidative stress. To verify if an enhanced cys production could represent a mechanism of environmental adaptation to Cr(VI), we isolated microalgae in habitats subject to abiotic stress for use in laboratory research. Algal samples were collected in a chromogen spring at Mount Prinzera, an ophyolitic mountain nearby Parma, Italy. In the water spring Cr(VI) levels are above legal limits (5 µg/l), with an average of 12 Cr(VI) µg/l depending on water flow, thus proving to be an optimal source for the isolation of organisms which could have evolved tolerance mechanisms to Cr(VI). Among the sampled organisms we isolated pure colonies of green algae, diatoms and cyanobacteria, identified through DNA barcoding. Among the isolated strains, three green algal species, *Neocystis* sp., *Bracteacoccus* sp. and *Chromochloris zofingensis* were tested with increasing Cr(VI) concentrations starting from a concentration 10-fold higher that of the spring in which they were isolated. This preliminary analysis allowed us to individuate species with different Cr(VI) tolerances, constituting good experimental material for future research on the role of sulfur uptake/assimilation pathway in Cr(VI) tolerance.