



Abstract

Exploring the Appetite Inhibition Potential of Bioactive Metabolites from Cyanobacterial Strains [†]

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Abstract: Higher food intake promotes obesity, a critical public health challenge with increasing prevalence worldwide. Selective modulators of appetite can be applied as therapeutic intervention. Nevertheless, currently the appetite suppressant drugs trigger severe side effects, such as anxiety and depression. For that reason, there is a priority to discover new pharmaceuticals. In this study, a library of 117 cyanobacterial fractions from marine and freshwater environments belonging to The Blue Biotechnology and Ecotoxicology Culture Collection (LEGE-CC) of CIIMAR (Interdisciplinary Centre of Marine and Environmental Research) were screened for their ability to interfere in the food intake behavior of zebrafish larvae—a whole small animal model. Two different bioassays were performed for appetite-reducing activity, using fluorescent stained liposomes (passive food intake) or *Paramecia bursaria* (active food intake). Three cyanobacterial fractions from the order Nostocales, Chroococciopsidales and Pleurocapsales expressed appetite-suppression bioactivity in the liposomes assay, while three different fractions from the order Synechococcales, Oscillatoriales and Nostocales significantly reduced the appetite in the Paramecium assay. To highlight putatively associated metabolites for the bioactivities, dereplication by metabolomics approaches (LC-MS/MS) was performed, as well as a bioactivity-guided feature-based molecular networking using GNPS, and four compounds were positively correlated to the bioactivity. No matches were found in any database for these molecules, indicating putatively new compounds. Molecular analyses are currently ongoing to discover the involved genes that regulate the passive and active food intake in zebrafish larvae, and consequently uncover the mechanisms of action.

Keywords: cyanobacteria; obesity; appetite inhibition bioassay; bioactive metabolites; zebrafish larvae; biotechnological applications

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