

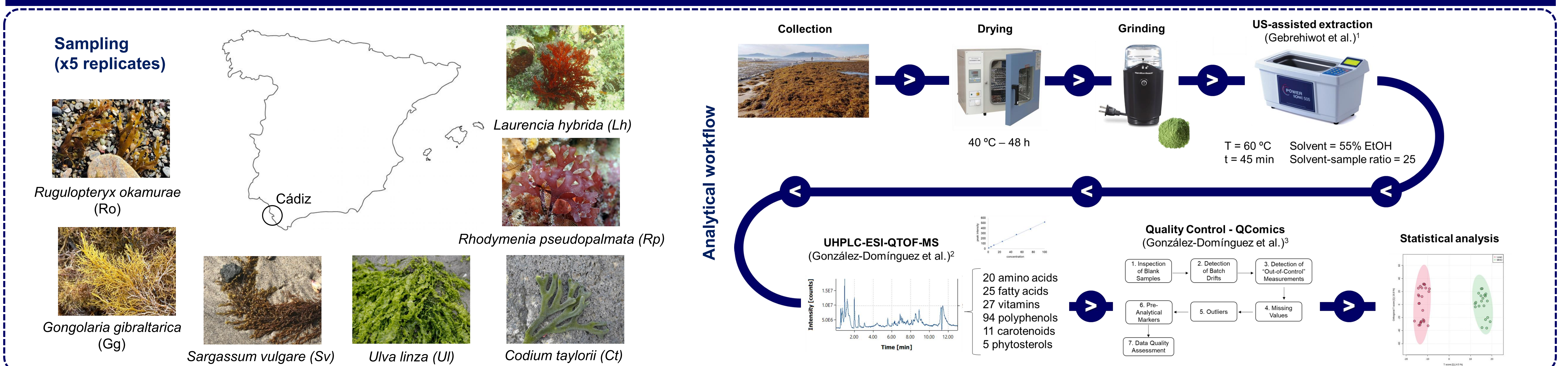
Characterization of the bioactive profile of beach-cast seaweeds using a quantitative and large-scale metabolomics approach

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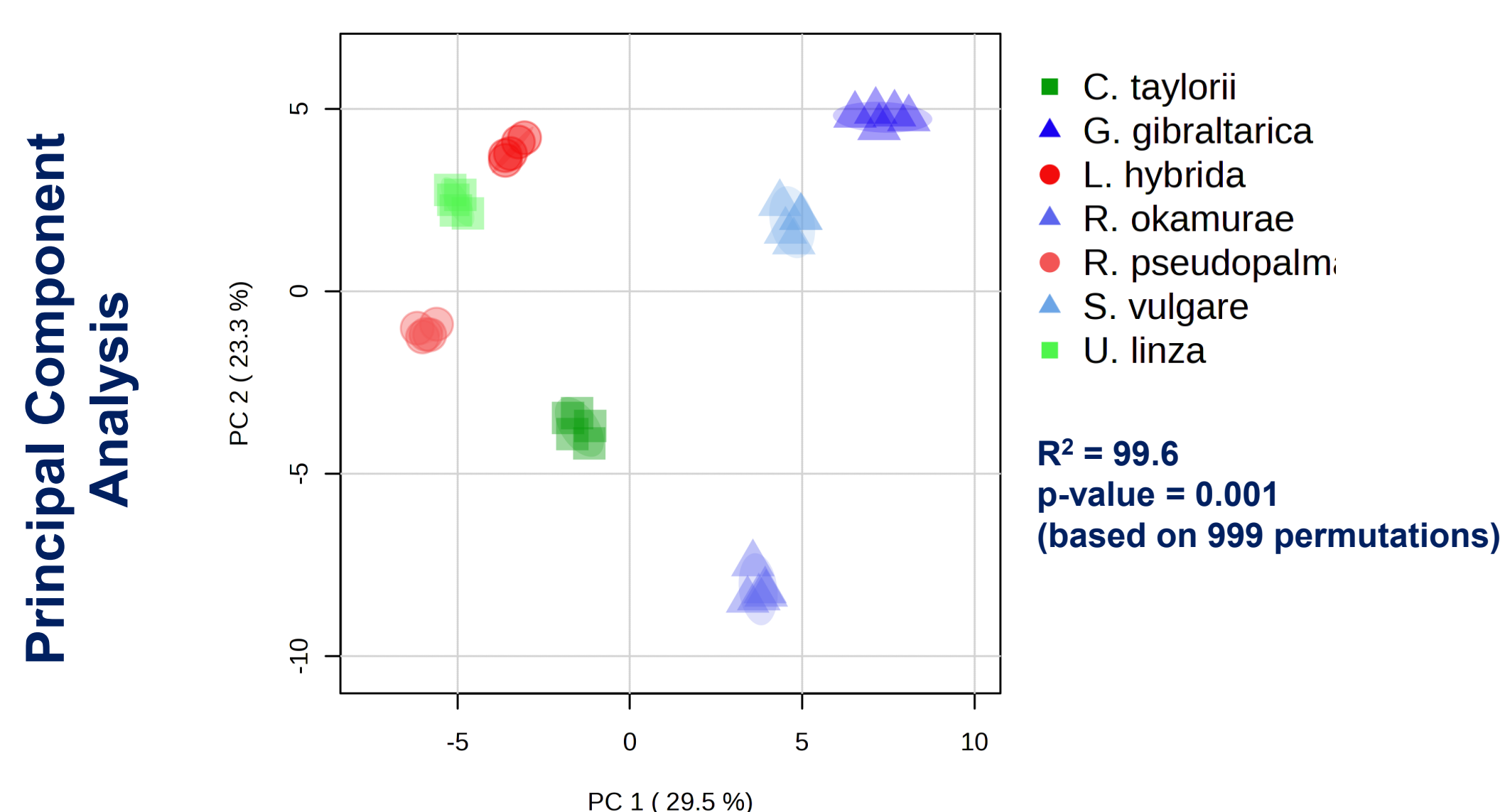
The proliferation and coastal accumulation of marine macroalgae (i.e., beach-cast seaweed) is a major environmental and socioeconomic issue, which requires new management and valorization strategies. Because of their rich content in compounds with health benefits, this natural resource could be exploited for elaborating nutraceuticals and food supplements. Herein, we aimed to compare the bioactive profile of various native brown (*Gongolaria gibraltaria*, *Sargassum vulgare*), green (*Codium taylorii*, *Ulva linza*), and red (*Rhodomenia pseudopalmeta*, *Laurencia hybrida*) species, as well as the invasive algae *Rugulopteryx okamurae*, using a quantitative and large-scale metabolomics approach.

METHODS

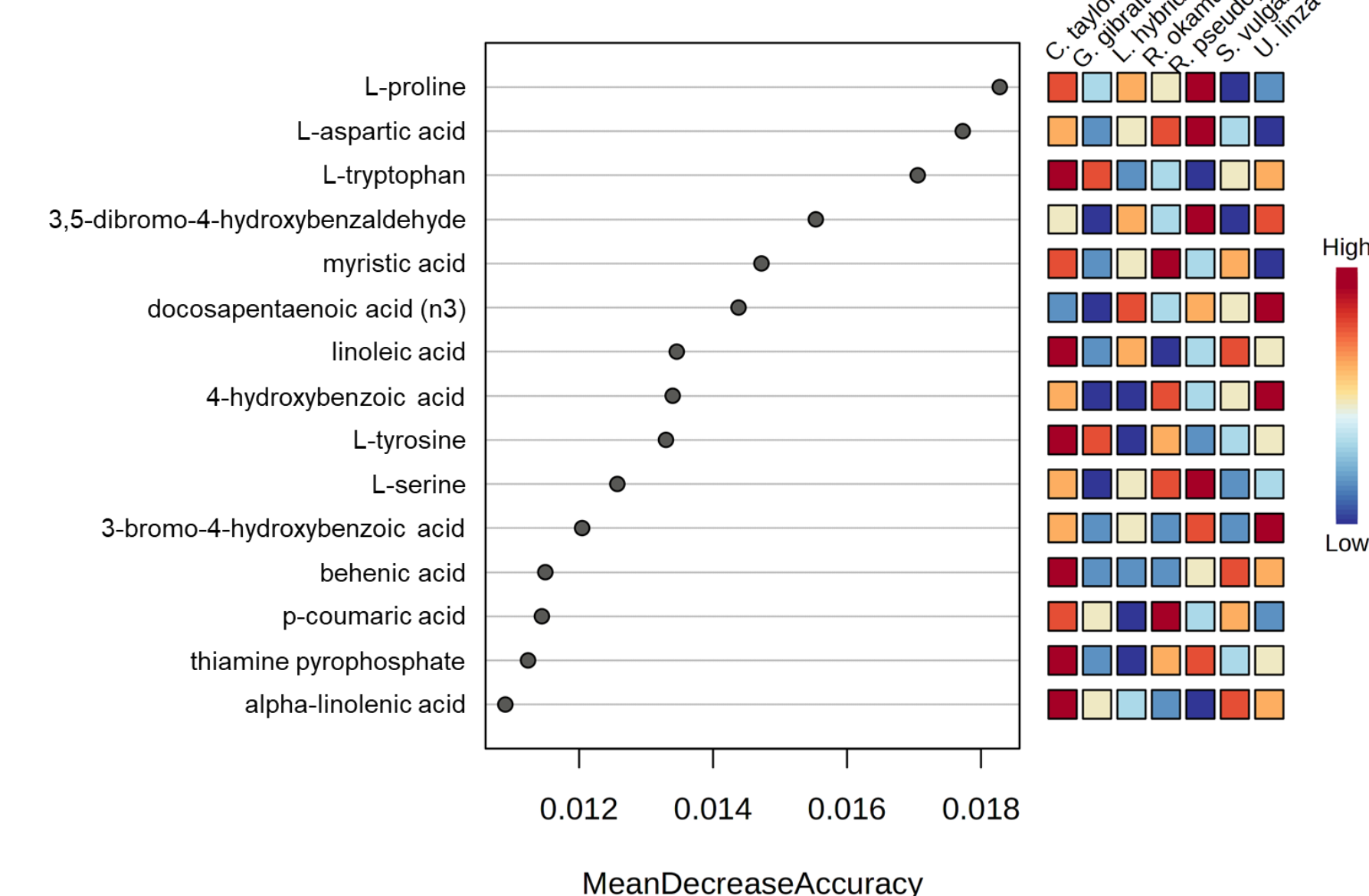


RESULTS

1 Multivariate statistical analysis

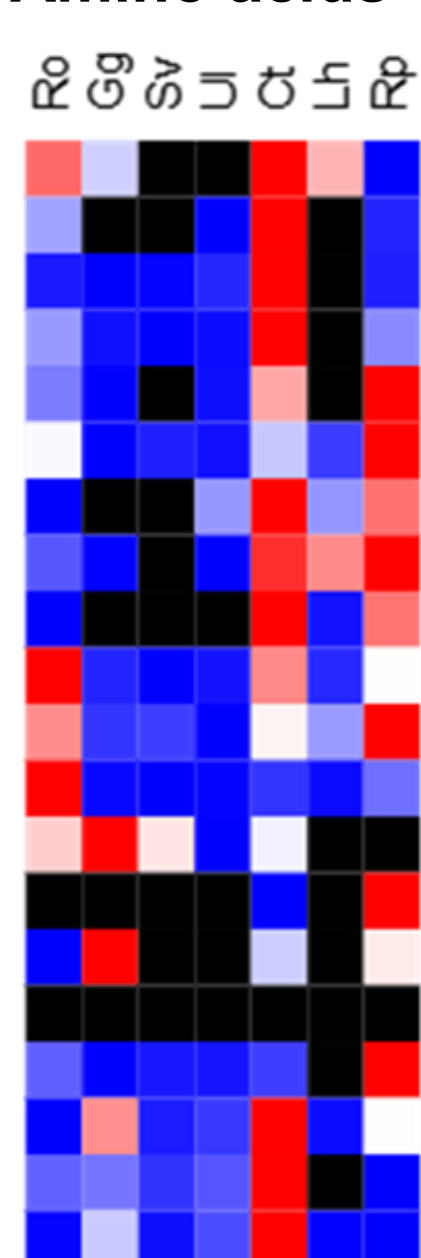


Random Forest



2 Heatmaps (relative concentrations)

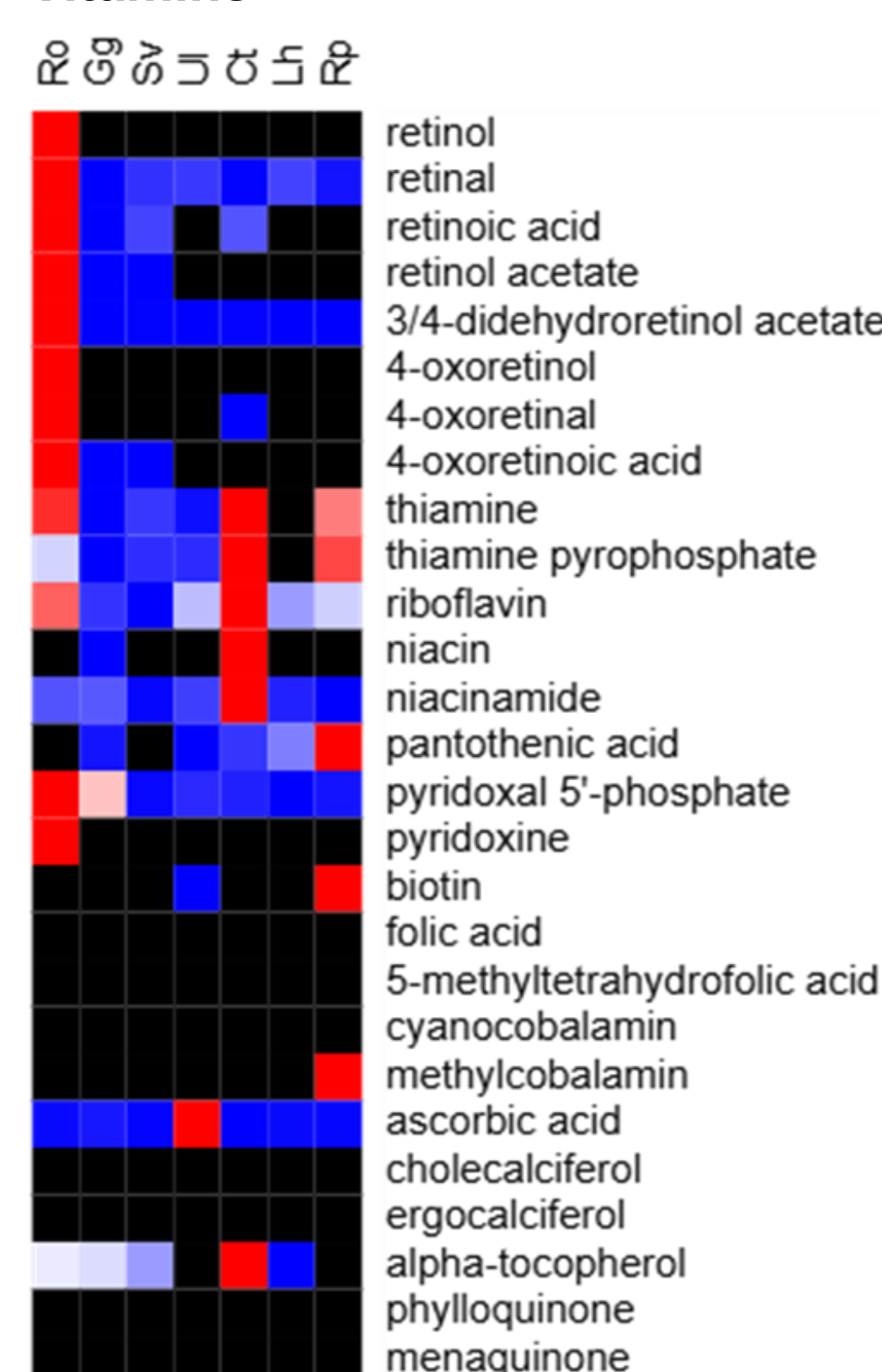
Amino acids



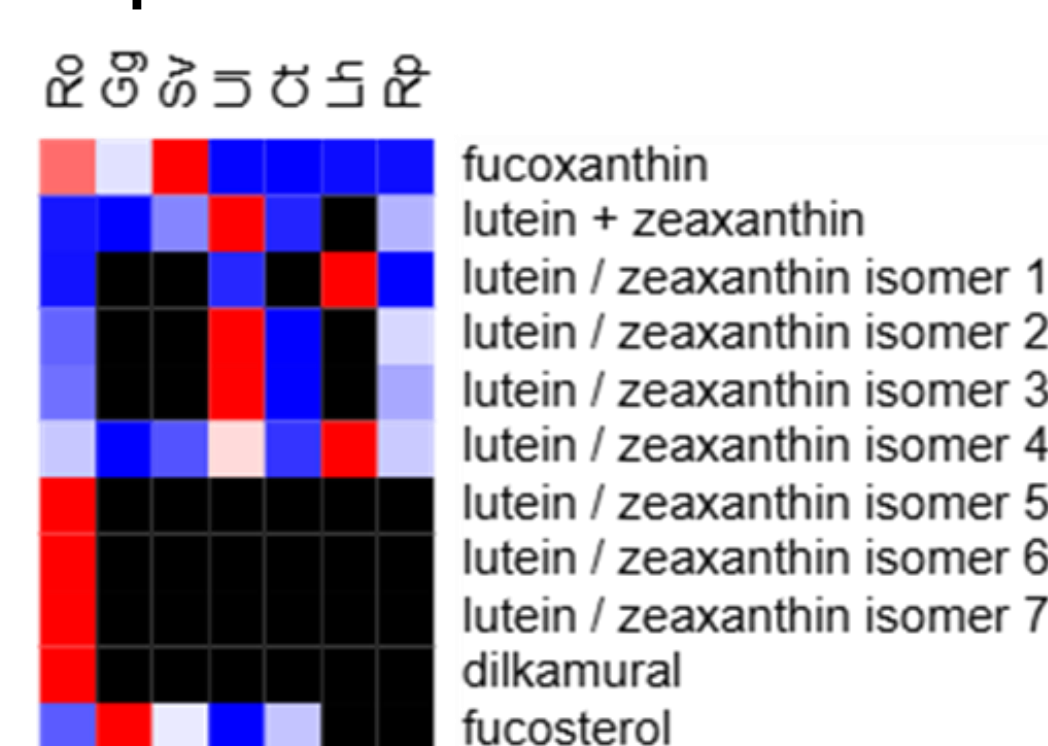
Fatty acids



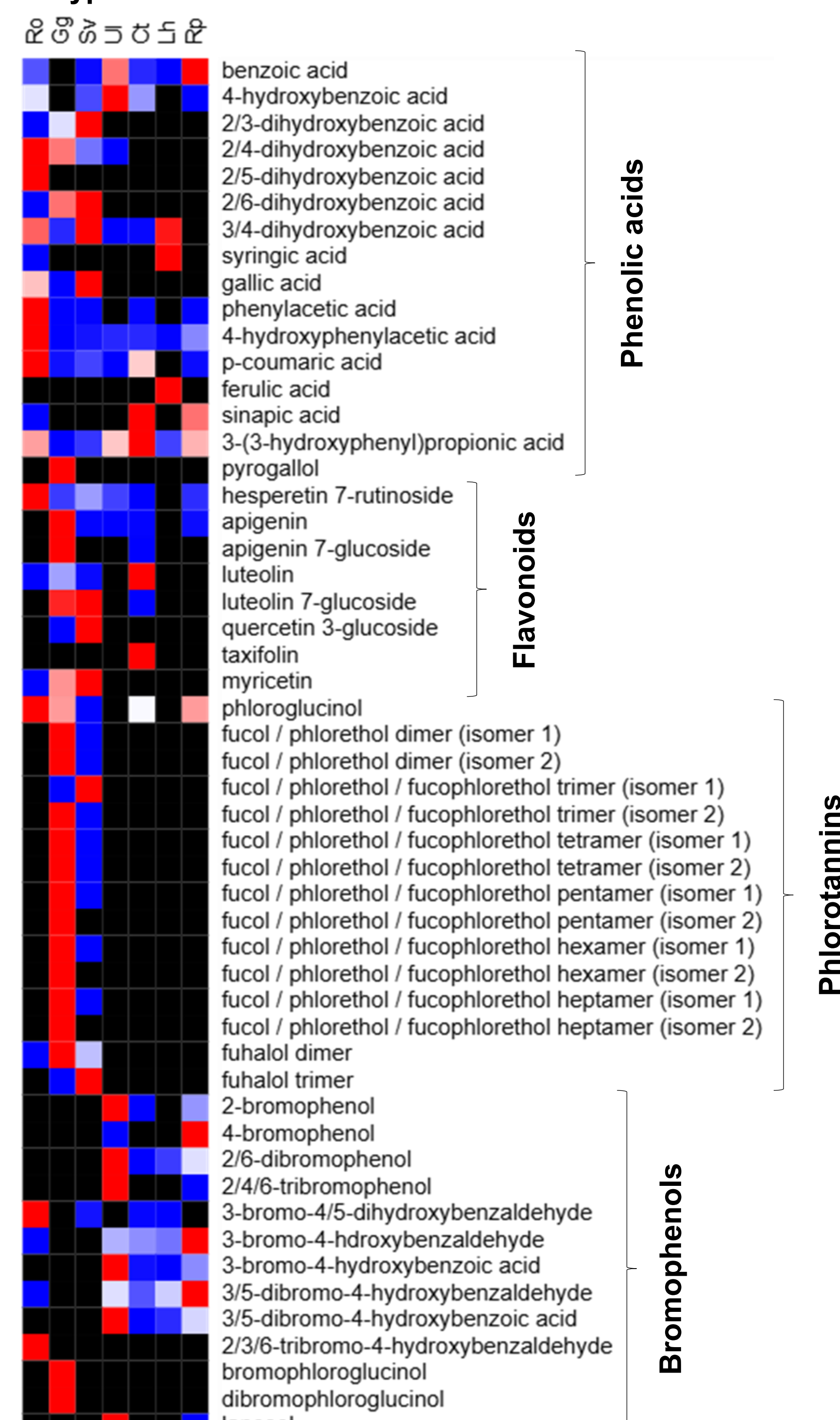
Vitamins



Terpenoids



Polyphenols



Phenolic acids

Flavonoids

Phlorotannins

Bromophenols

CONCLUSIONS

- ✓ Higher levels of most phytochemicals under study (i.e., polyphenols, terpenoids) were observed in brown algae species.
- ✓ Many essential amino acids and fatty acids were found to be particularly abundant in the green algae *Codium taylorii*.
- ✓ Although showing a poorer bioactive profile in general terms, red seaweeds stand out as an ideal source for specific compounds normally present at lower concentrations in other species (e.g., docosahexaenoic acid or vitamin B5).
- ✓ The valorization of beach-cast seaweeds could be of great interest for the pharmaceutical and food industries, not only because of their high content of bioactive compounds with anti-inflammatory and antioxidant activity, but also in order to minimize and provide an added-value to these wastes within the framework of the circular economy and green chemistry

References

- Gebrehiwot et al. See P_39 at GRASEQA 2025
- González-Domínguez Á et al. Methods Mol Biol 2023, vol. 2571, p. 123-132.
- González-Domínguez Á et al. Anal Chem 2024, 96, 1064-1072.

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