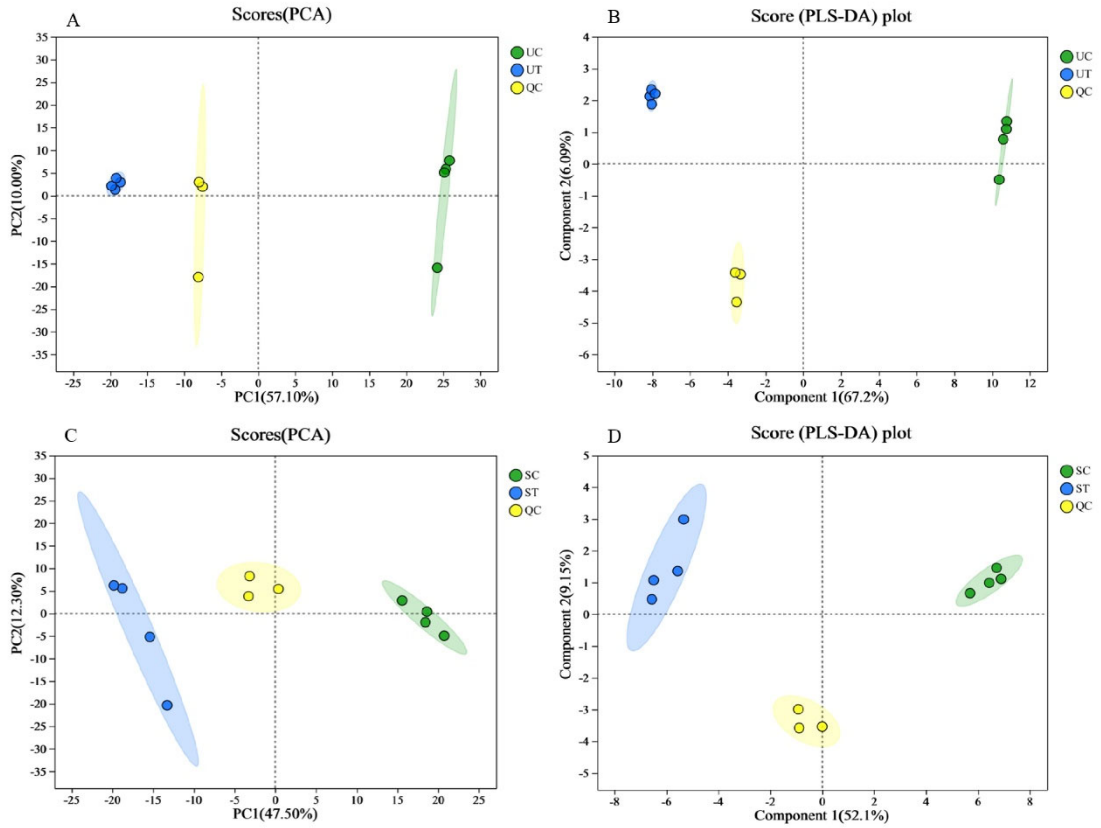


Figure S1 Principal component analysis (PCA) of metabolites in *U. prolifera* (A) and *S. horneri* (C) groups; Partial least squares-discriminate analysis (PLS-DA) of metabolites in *U. prolifera* (B) and *S. horneri* (D) groups.

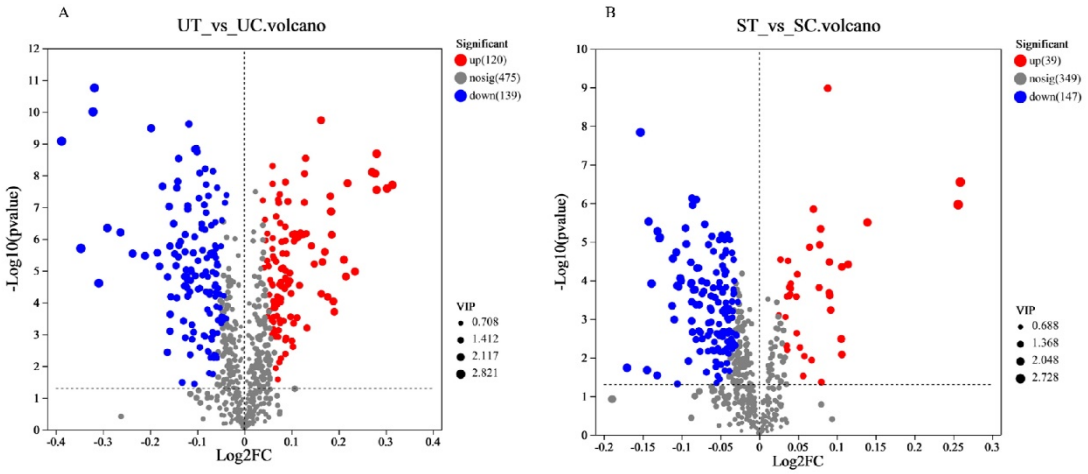


Figure S2 Volcano maps of intergroup differential metabolites in *U. prolifera* (A) and *S. horneri* (B) groups.



Figure S3 Algal samples used in the experiments collected in June 2022. *U. prolifera* samples from Xiaomai Island and Lingshan Island, Qingdao (A, C); *S. horneri* samples from the kelp aquaculture area in Li Island, Rongcheng (B, D). C shows reproductive cells in *U. prolifera* tissues, while D shows the receptacles of *S. horneri*.