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Supplementary Data

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# Changes in organic carbon properties during intense plankton blooms and macroaggregate formation in the coastal Adriatic Sea, Croatia (case studies in 2020–2022)

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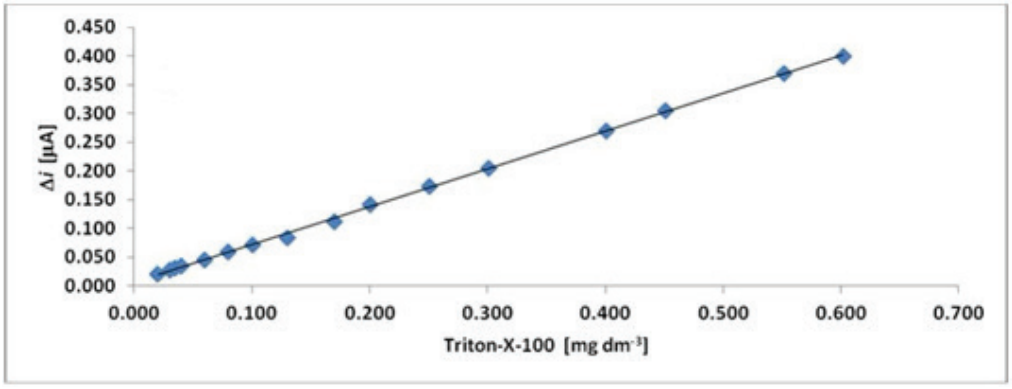


***Fig. S1:*** Calibration plot (linear scale) of Δ*i* versus Triton-X-100 in 0.55 M NaCl. (Δ*i* - adsorption effect measured as the difference between capacity current for base electrolyte and aqueous solutions of surfactant (A).

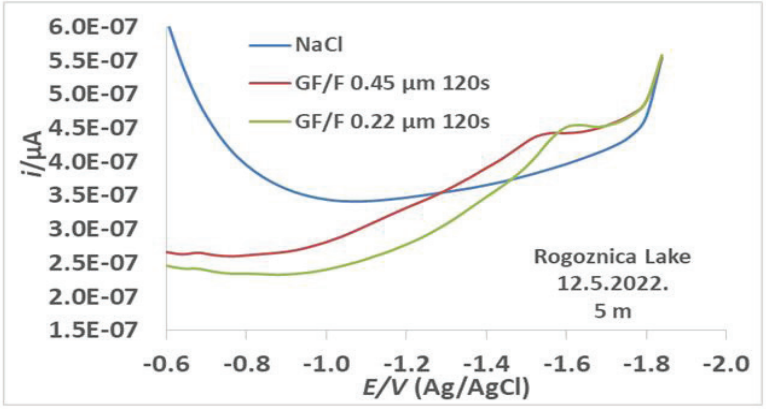


***Fig. S2:*** A.c. voltammograms of the water column sample of Rogoznica Lake sampled at 5m depth, where intense biological activity was recorded. Voltammetric curves revealed the typical desorption wave at around -1.6 V vs. Ag/AgCl in the filtered fractions smaller than 0.45 and 0.22 μm. In a fraction smaller than 0.22 μm, due to the presence of colloidal, highly surface-active OM, the desorption wave was even more expressed and for about 50 mV more negatively positioned. Experimental conditions: accumulation time, ta= 120 s at -0.6 V vs. Ag|AgCl.

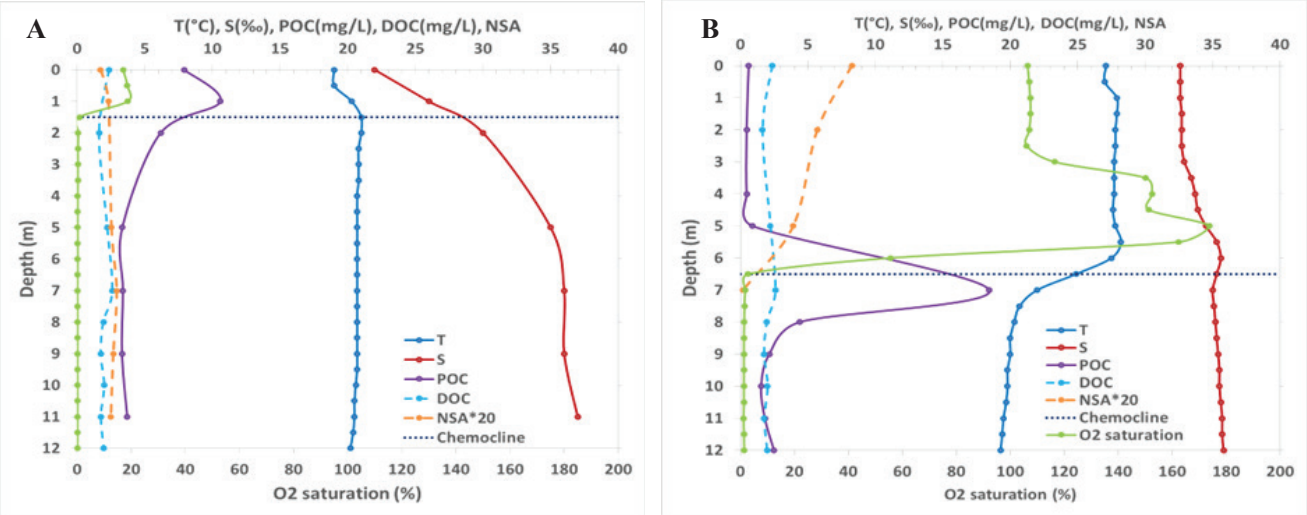


***Fig. S3:*** Physico-chemical properties of the Rogoznica Lake water column on October, 20 2020 (A) and June 28th, 2021 (B). NSA parameter (SAS/DOC ratio) was determined up to the chemocline layer, considering that SAS cannot be measured in an anoxic sample due to reduced sulphur species interference (Simonović *et al.*, 2023).

**Table S1.** Organic carbon properties (DOC, SAS, NSA) and plankton abundance in surface samples during: the red tide caused by dinoglagellate *Noctiluca scintillans* (A) and zooplankton bloom of invasive ctenophore *Mnemiopsis leidyi* (B).

| A<br>Sampling date | Sampling location | Coordinates | DOC (mg $L^{-1}$) | SAS (mg $L^{-1}$) | NSA | Abundance (cells $L^{-1}$) |
|---|---|---|---|---|---|---|
| **31.3.2021.** | Port of Rovinj-Rovigno* | 45.08097°N, 13.63473°E | 106.9 | 13.5 | 0.127 | 12008 |
| **31.3.2021.** | Old Town* | 45.08299°N, 13.63195°E | 105.8 | 8.37 | 0.079 | 33453 |
| **31.3.2021.** | Valdibora Bay* | 45.09021°N, 13.63339°E | 318.1 | 14.3 | 0.045 | 72010 |
| **15.4.2021.** | Škaraba Bay* | 45.06511°N, 13.63845°E | 236.3 | 15.4 | 0.065 | 78302 |
| **16.4.2021.** | Lone Bay* | 45.06988°N, 13.63295°E | 11.39 | 2.88 | 0.253 | 46800 |
| **23.4.2021.** | ACI Marina Rovinj-Rovigno* | 45.07566°N, 13.63502°E | 13.65 | 2.58 | 0.211 | 48696 |

*measured in dilution.

| B<br>Sampling date | Sampling location | Coordinates | DOC (mg $L^{-1}$) | SAS (mg $L^{-1}$) | NSA | Abundance (ind $m^{-3}$) |
|---|---|---|---|---|---|---|
| **24.8.2020.** | Valdibora Bay | 45.09021°N, 13.63339°E | 0.959 | 0.147 | 0.153 | 20 |
| **25.8.2020.** | | | 1.602 | 0.162 | 0.101 | 20 |
| **27.8.2020.** | | | 1.494 | 0.203 | 0.136 | 0.1 |
| **27.8.2020.** | | | 2.222 | 0.334 | 0.150 | 60 |
| **27.8.2020.** | | | 6.768 | 1.338 | 0.198 | 80 |
| **27.8.2020.** | | | 8.581 | 1.453 | 0.169 | 100 |
| **7.9.2020.** | | | 2.817 | 0.611 | 0.217 | 400 |

No.ind- number of individuals.

**Table S2.** Organic carbon properties (DOC, SAS, NSA) of RL (from 2020 to 2022) surface oxic layer (A), chemocline (B) and samples with maximal oxygen saturation (C). Display C also represent samples where specific desorption peak (represented in Fig. 3.A.e) was measured by a.c. voltammetry method.

| ***A*** Sampling date | ***Rogoznica Lake*** *(43.53091°N, 15.95876°E)* | DOC (mg $L^{-1}$) | SAS (mg $L^{-1}$) | NSA |
|---|---|---|---|---|
| 16.12.2020. | Surface layer [0-2]m | 2.378 | 0.242 | 0.102 |
| 27.1.2021. | | 2.125 | 0.190 | 0.089 |
| 24.3.2021. | | 2.089 | 0.177 | 0.085 |
| 28.6.2021. | | 1.994 | 0.193 | 0.097 |
| 6.9.2021. | | 1.742 | 0.262 | 0.150 |
| 12.10.2021. | | 1.178 | 0.246 | 0.138 |
| 23.11.2021. | | 1.984 | 0.247 | 0.125 |
| 16.2.2022. | | 1.691 | 0.211 | 0.130 |
| 6.4.2022. | | 1.577 | 0.209 | 0.133 |
| 12.5.2022. | | 1.576 | 0.198 | 0.126 |
| 18.7.2022. | | 2.214 | 0.179 | 0.081 |
| ***B*** ***Sampling date*** | ***Rogoznica Lake*** *(43.53091°N, 15.95876°E)* | ***DOC (mg $L^{-1}$)*** | ***SAS (mg $L^{-1}$)*** | ***NSA*** |
| 27.1.2021. | Chemocline | 2.253 | 0.202 | 0.089 |
| 28.6.2021. | | 2.592 | 0.198 | 0.073 |
| 16.9.2021. | | 1.742 | 0.243 | 0.139 |
| 12.10.2021. | | 1.714 | 0.235 | 0.137 |
| 23.11.2021. | | 1.955 | 0.214 | 0.109 |
| 12.10.2021. | | 1.365 | 0.163 | 0.119 |
| 23.11.2021. | | 1.159 | 0.163 | 0.102 |
| 18.7.2022. | | 2.388 | 0.150 | 0.063 |
| ***C*** ***Sampling date*** | ***Rogoznica Lake*** *(43.53091°N, 15.95876°E)* | ***Depth (m)*** | ***DOC (mg $L^{-1}$)*** | ***SAS (mg $L^{-1}$)*** | ***NSA*** |
| 16.2.2022. | Oxygen saturation maximum (> 100%) | 0 | 2.018 | 0.278 | 0.138 |
| 6.4.2022. | | 0 | 1.638 | 0.235 | 0.144 |
| | | 2 | 1.515 | 0.183 | 0.121 |
| 12.5.2022. | | 5 | 2.044 | 0.333 | 0.163 |
| 18.7.2022. | | 0 | 2.823 | 0.229 | 0.081 |
| | | 6 | 1.809 | 0.200 | 0.111 |
| *10.11.2022.* | | 0 | 4.175 | 0.258 | 0.062 |