

**Table S3** Review of *Arthrospira fusiformis* (Cyanobacteria) and *Picocystis salinarum* (Chlorophyta) characteristics.

Descriptors	<i>Arthrospira fusiformis</i>	<i>Picocystis salinarum</i>
Phylum	Bacteria	Eukaryota
Synonymous	<i>Spirulina platensis</i> , <i>Arthrospira platensis</i>	-
Phylogeny	Cyanobacteria, Oscillatoriales, well supported cluster of <i>Arthrospira</i> [18]	Chlorophyta, Prasinophyceae, not well supported Clade VII [50].
Habitats	Wide range distribution in freshwater to hypersaline habitats [86]	Widespread in saline to hypersaline ecosystems. Oxic and anoxic environments [86].
Morphology	Planktonic, filamentous, solitary trichomes, lengthened (170-2,390 $\mu\text{m}$ ), cells are 9-12 $\mu\text{m}$ wide, 3-7 $\mu\text{m}$ length, with aerotopes regulating buoyancy, non heterocytous, generally coiled with coil diameter: 15-60 $\mu\text{m}$ and distance between two coils: 0-80 $\mu\text{m}$ but straight in Lake Dziani Dzaha, multiplication by fragmentation [18]	Planktonic, green, spherical or ovoid, about 1.5-2.0 $\mu\text{m}$ in diameter, no flagella, bilobed chloroplast [18, 87]
Biovolume ( $\mu\text{m}^3$ )	Cylindrical cell (this study): 235	Spherical cell (this study): 10
Surface/volume	Straight filament: 0.45	Spherical cells: 2.2
Sinking properties	Regulated by the numerous aerotopes and buoyancy, straight filament [18]	Low intrinsic sinking rate due to the small size [70]
Biomass	Highly productive primary producer. Max. 200-1430 $\text{mg L}^{-1}$ dry mass	Highly productive primary producer. Max. 1.0-3.5 x 10 <sup>9</sup> cells $\text{L}^{-1}$ [14]
Grazers	Lesser Flamingos, fish ( <i>Alcolapia graham</i> Boulenger, rotifers ( <i>Brachionus dimidiatus</i> Bryce), <i>B. plicatilis</i> Müller, <i>Hexarthra jenkiniae</i> De Beauchamps), copepods ( <i>Lovenula africana</i> Daday), insects (chironomids) [86].	Brine shrimp: <i>Artemia monica</i> [73]. Crustacean: <i>Lovenula africana</i> Daday [88]. Rotifers: <i>Brachionus dimidiatus</i> Bryce and <i>B. plicatilis</i> Müller [14]. Amoebae.
Biomass crash causes	Cyanophages [89]	Unknown
Salinity tolerance	<u>Natural conditions</u> : 1-300 psu [90] <u>Laboratory conditions</u> : 8.5 - 200 psu [91, 92]	<u>Natural conditions</u> : 10-300 psu. Able to outcompete <i>Arthrospira</i> in high salinity conditions [86]. <u>Laboratory conditions</u> : 0-260 psu [73]
Osmoprotectants	Accumulation of low MW carbohydrates: glucosyl-glycerol, trehalose, glucosylglycerate [93]	Cellular glycine betaine, dimethylsulfoniopropionate [73].
Temperature tolerance	>35°C [94]	>30°C [95]

pH tolerance	>11 [96] pH homeostasis dependent of sodium concentrations [97]	4-12 [73]
Growth rate	Fast-growing : 0.8-1.5 d <sup>-1</sup> , at 35 °C, under saline conditions [98]	Fast-growing rate: 0.7-1 d <sup>-1</sup> [14]
Pigments (specific wavelengths absorbance in nm)	<u>Majors</u> : Chlorophyll-a (431, 617, 666 nm), phycocyanin (550-650) <u>Minors</u> : carotenoids β-carotene, zeaxanthin (this study).	<u>Majors</u> : Chlorophyll a (431, 617, 666 nm), Chlorophyll b (461, 599, 648 nm), β-carotene (454, 479 nm), diatoxanthin (451, 479 nm), monadoxanthin (448, 475 nm) <u>Minors</u> : neoxanthin, violaxanthin, antheraxanthin, lutein, zeaxanthin, alloxanthin [73, 87, 99] Positive growth at very low irradiance (e.g., 0.6 μmol photons m <sup>-2</sup> s <sup>-1</sup> ) Adapted to low irradiance. Positive growth rate (0.2 d <sup>-1</sup> ) at 0.6 μmol photons m <sup>-2</sup> s <sup>-1</sup> [73]
Adaptations to high turbidity	Buoyancy with aerotopes (gas vesicles), high cellular pigment concentrations	
Adaptations to light	Adaptation to high light: self-shading, photoprotective mechanisms, accumulation of bicarbonate in the cytoplasm [93]	
Proteins	60-70 % per unit dry mass [100]	
Lipids	Low content (depending of the culture conditions)	High content during nitrogen limitation [95]
Carbohydrates	10 to 15 % of dry biomass, mainly as rhamnose and glycogen [93]	
Genome size	6 to 6.7 Mpb [93]	25 Mbp estimated by flow cytometry [99]
N <sub>2</sub> -fixation potential	Non-nitrogen fixing species but genes responsible for heterocyst maturation ( <i>patU</i> , <i>hetR</i> , <i>hetF</i> ) and nitrogen fixation conserved in all <i>Arthrospira</i> genomes [93]	Non-nitrogen fixing species

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