Supplementary

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Biochemical composition of Nostoc muscorum and Arthrospira platensis biomass

Table 1S showed the growth indices results of *N. muscorum* and *A. platensis*, as dry weight at the end of the exponential phase, represented as mg/ml. Chlorophyll a (Chl. a) content of the growth cultures *A. platensis* recorded the highest quantity of 2.03 and 0.03 mg/ml for dry weight and chlorophyll content, respectively. This was followed by *N. muscorum* of 0.01 and 0.64 mg/ml for the same parameters, respectively.

Phycocyanin (PC), phycoerythrin (PE), allophycocyanins (APC), and total phycobiliprotein contents in both tested species were also recorded in Table 1S. *N. muscorum* showed higher content in phycoerythrin (0.12 mg/ml) and allophycocyanins (0.071 mg/ml) while *A. platensis* showed a higher content of phycocyanin (0.14 mg/ml). Total soluble carbohydrate and total soluble protein presented the maximum contents in *A. platensis* biomass (4.7 and 20.5mg/mL, respectively) over the biomass of *N. muscorum* (3.8 and 15.3mg/mL, respectively) (Table 1S).

Antioxidant activity of Nostoc muscorum and Arthrospira platensis aqueous extracts and biomass at different concentrations

The antioxidant activities of *N. muscorum* and *A. platensis* aqueous extracts and biomass were analyzed using DPPH, hydrogen peroxide, and phosphomolybdenum radical scavenging assays. As revealed from Fig. 1S (a and b), *A. platensis* aqueous extract at a concentration of 1% showed the highest scavenging activity of 69%, 79%, and 3.1mg/g, for the three previous assays, respectively. Similarly, *N. muscorum* at the same concentration (1 %) showed scavenging activity of 60 %, 62 %, and 1.5mg/g for the same previous assays, respectively. On the other hand, aqueous extracts at a concentration of 0.25% showed the lowest scavenging activity as detected by different antioxidant scavenging methods for both species.

As shown in Fig 2S (a and b), *A. platensis* biomass at a concentration of 1 % showed the highest scavenging activity of 61.3 %, 69 %, and 0.69 mg/g, for the three previous assays, respectively. For *N. muscorum* biomass, the same concentration also resented maximum radical scavenging values of 52 %, 52.8 %, and 0.55 mg/g, respectively. Also, the biomass at 0.25 % concentration showed the lowest scavenging activity. Collectively, the antioxidant activity of the aqueous extracts was higher than the corresponding activity in the biomass of both species.

TABLE 1S. Dry weight and biochemical composition of *N. muscorum* and *A. platensis* biomass*

Parameters (mg/mL)	*N. muscorum*	*A. platensis*	*t value*
Dry weight	0.64±0.004	2.03±0.24	202.9*
Chl. a	0.01±0.001	0.03±0.002	15.10*
PC	0.08±0.002	0.14±0.005	20.83*
PE	0.12±0.002	0.08±0.001	27.30*
APC	0.07±0.003	0.04±0.002	21.9*
Total phycobiliprotein	0.27±0.001	0.26±0.01	9.171*
Total Carbohydrates	3.81±0.17	4.72±0.36	86.01*
Total protein	15.05±1.3	20.55±1.8	182.3*

*Values are mean of replicates ± SD (n= 5)
*= t value indicates a significant difference at P< 0.05.

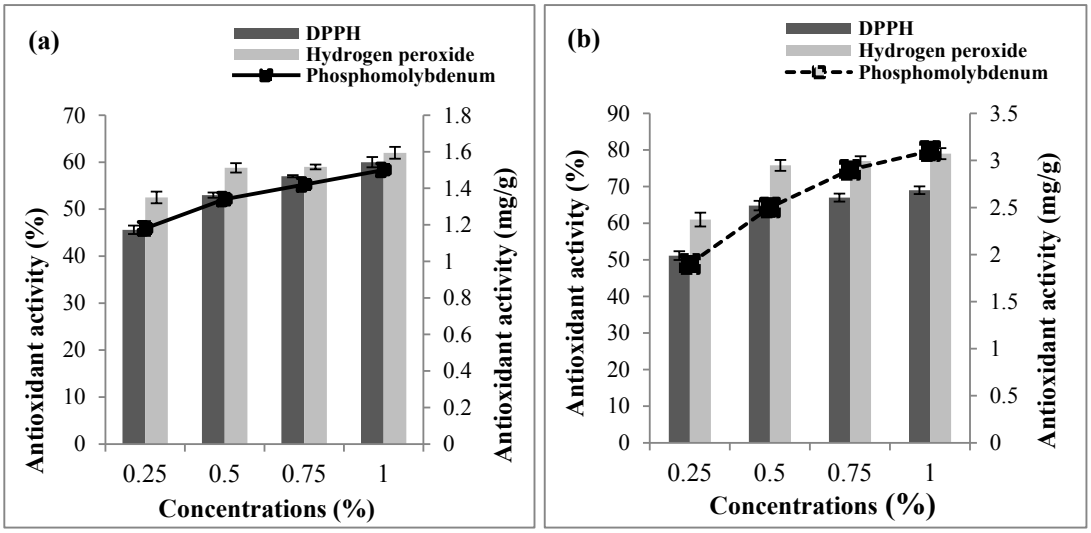

Fig. 1S. Antioxidant activity of aqueous extracts of (a) *N. muscorum* and (b) *A. platensis*.

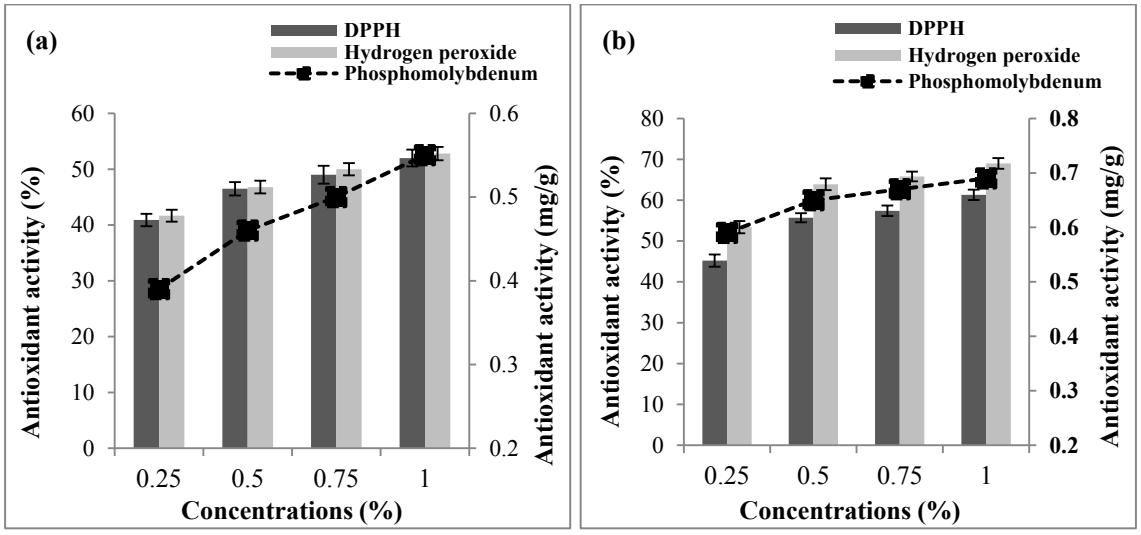

Fig. 2S. Antioxidant activity of biomass of (a) *N. muscorum* and (b) *A. platensis*

The results illustrated in Table 2S revealed that the total phenolic and flavonoids content of *A. platensis* water extracts was higher than the content of *N. muscorum* aqueous extracts, depending on the tested concentration of the extracts. *A. platensis* water extract at 1% concentration, recorded the highest content of phenolic and flavonoid compounds (0.15 and 0.1mg/g DW), compared to *N. muscorum* aqueous extract contents (0.072 and 0.06mg/g DW, respectively) at the same concentration of 1 %. Furthermore, results in Table 2S showed that the total phenolic and flavonoids content of *A. platensis* biomass was higher than *N. muscorum* biomass. The highest content of phenolic and flavonoid compounds of 0.08 and 0.071mg/g DW, respectively was recorded by *A. platensis* biomass (1 %), while evaluated 0.05 and 0.041 mg/g DW), respectively for *N. muscorum* biomass content (1%).

Qualitative and quantitative phytochemical composition of N. muscorum and Arthrospira platensis aqueous extracts and biomass

The obtained results by phytochemical analysis of *N. muscorum* and *A. platensis* showed the presence of valuable secondary metabolites such as phenols, flavonoids, alkaloids, terpenoids, and steroids (Table 3S) from both aqueous extracts and biomass. Tannins and cardiac glycosides were not detected in water extracts or biomass.

TABLE 2S. Quantitative determination of phenolic and flavonoid compounds (mg/g DW) of *N. muscorum* and *A. platensis* aqueous extracts and biomass at different concentrations*

Concentration (%)	Phenolic content in aqueous extract	Flavonoid content in aqueous extract	Phenolic content in biomass	Flavonoids content in biomass
A. platensis				
0.25	0.060±0.02[a]	0.042±0.004[a]	0.040±0.01[a]	0.03±0.006[a]
0.5	0.087±0.02[b]	0.061±0.01[b]	0.055±0.02[b]	0.045±0.01[b]
0.75	0.10±0.03[c]	0.080±0.02[c]	0.066±0.03[c]	0.060±0.007[c]
1	0.15±0.02[c]	0.10±0.01[d]	0.080±0.009[d]	0.071±0.009[c]
N. muscorum				
0.25	0.044±0.005[a]	0.03±0.007[a]	0.036±0.004[a]	0.012±0.002[a]
0.5	0.058±0.02[b]	0.045±0.01[b]	0.040±0.01[a]	0.021±0.003[b]
0.75	0.063±0.006[c]	0.05±0.006[b]	0.045±0.005[b]	0.035±0.005[c]
1	0.072±0.01[d]	0.06±0.005[c]	0.05±0.006[b]	0.041±0.006[c]

*Data are presented as the mean±SD (n= 5). Different small letters for the same parameter indicate a significant difference at P< 0.05.

TABLE 3S. Qualitative determination of phytochemical constituents of *A. platensis* and *N. muscorum* water extracts and biomass

Phytochemical constituents	*A. platensis* water extract	*N.muscorum* waterextract	*A. platensis* biomass	*N. muscorum* biomass
Alkaloids	+	+	+	+
Glycosides	-	-	-	-
Flavonoids	+++	++	++	+
Phenols Steroids	+++	++	++	+
Tannins	+	+	+	+
Terpenoids	-	-	-	-
	+	+	+	+

(+) present, (-) absent

Germination percentage and germination rate

Results listed in Table 4S showed the effect of different priming treatments on the germination percentage and rate (%) along the cultivation period of the wheat seedlings (10 days). A gradual grain sprouting was noticed from day 4 to day 7, in which the grains primed in cyanobacterial treatments of *N. muscorum* and *A. platensis* achieved a maximum emergence rate. For the water control and tryptophan treatments, a period of 10 days was needed for all the sowing wheat grains to germinate.

TABLE 4S. Effect of different priming treatments on the germination percentage and rate (%) of the emerged wheat seedlings*

Treatment	Priming time (h)	Relative grain germination (%)	Germination rate (%) per day			
			4	5	7	10
Control	2	100	0	0	60%	100%
	6	100	0	0	60%	100%
	12	100	0	0	60%	100%
Tryptophan (100 ppm)	2	100	20%	30%	60%	100%
	6	100	25%	40%	65%	100%
	12	100	35%	50%	65%	100%
N.muscorum extract (1%)	2	100	30%	35%	100%	
	6	100	40%	50%	100%	-
	12	100	60%	75%	100%	
A. latensis extract (1%)	2	100	38%	45%	100%	
	6	100	45%	60%	100%	-
	12	100	55%	80%	100%	

*Data are presented as the mean±SD (n= 5).