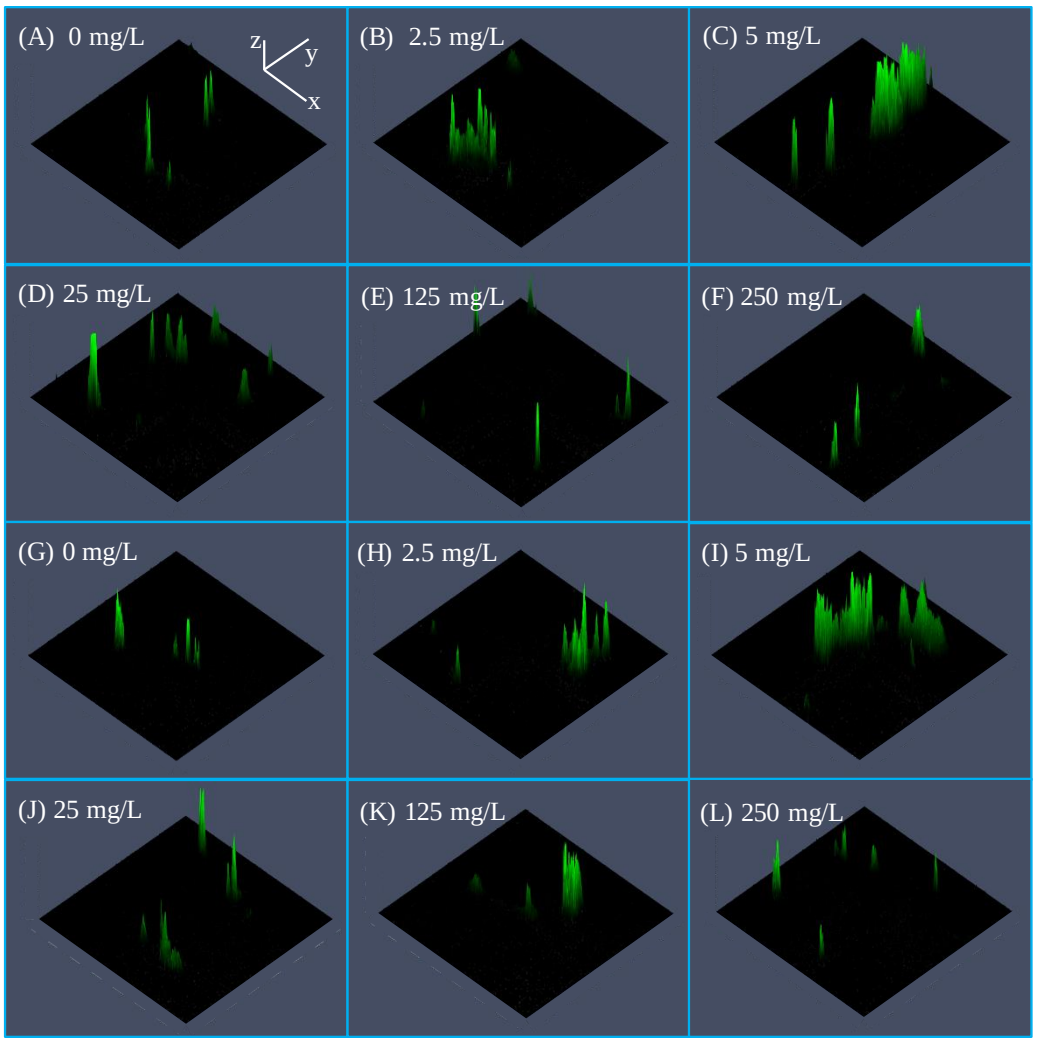

Fig. 1 Confocal laser scanning microscopy images of *C. microsphaera* cells (green) attached on the carbon felt (black) after 720-min incubation under various initial nitrate (A - F) or phosphate (G - L) concentrations. Scale bars represent 100 μm.

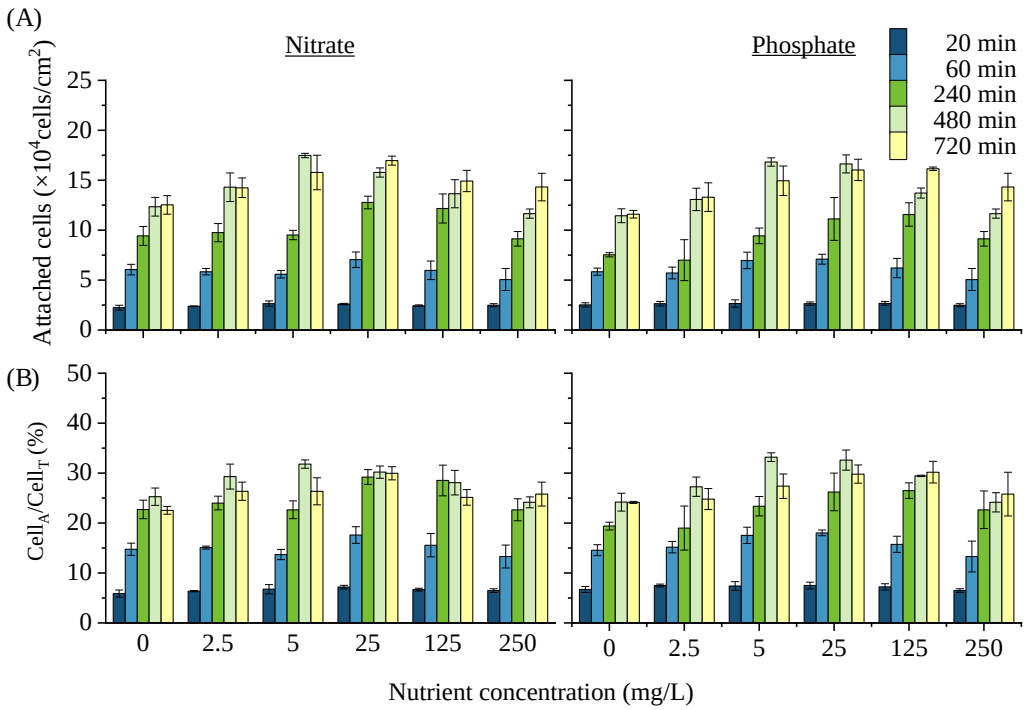

Fig. 2 (A) Measurements (Mean ± SD, n = 3 for cell attachment) of microalgal cell attachment and (B) attaching ratio ($Cell_A/Cell_T$) onto carbon felt under various nutrient concentrations at different times after inoculation. Colors in panels represent data collected at different times after inoculation. $Cell_A/Cell_T$ represents a ratio of the number of the attached cells to the number of the total cells in the reactors.

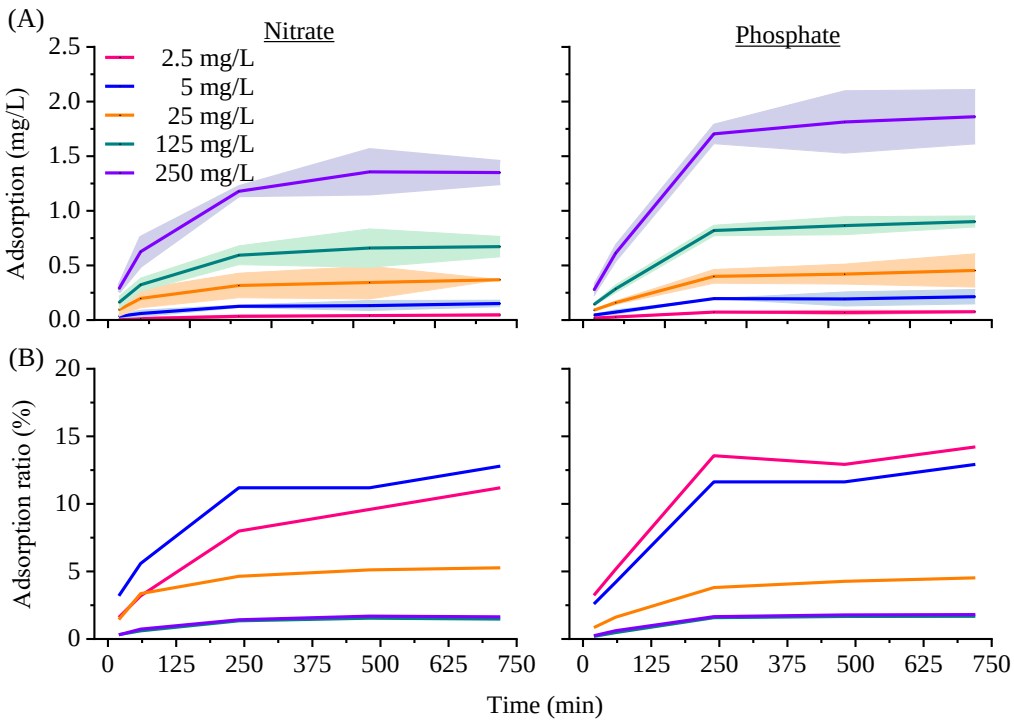

Fig. 3 Nitrate and phosphate adsorption ratios (Mean ± SD, n = 3) on carbon felt under various initial nitrate or phosphate concentrations at different times after inoculation. Color bands represent errors of the data collected at different times. Adsorption ratio represents nutrient adsorption amount to the initial nutrient supply.

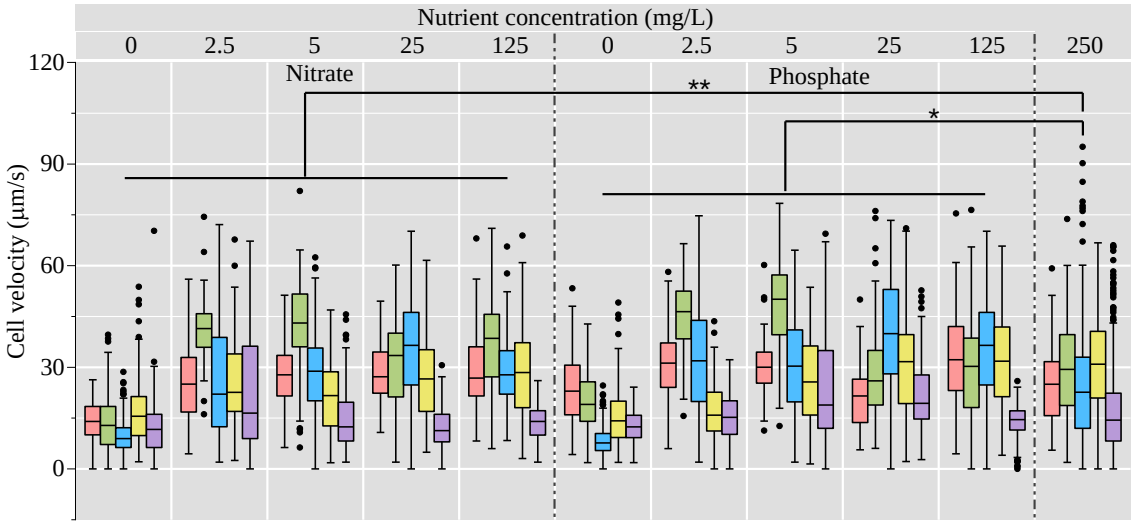

Fig. 4 Measurements (Mean ± SD, n >= 100 for cell velocity) of cell velocity of *C. microsphaera* under various initial nitrate or phosphate concentrations at different times after inoculation. Colors represent data collected at different times after inoculation, 20 min (pink), 60 min (orange), 240 min (green), 480 min (yellow) and 720 min (purple). The crosspieces of box plots (from top to bottom) are maximum, upper-quartile, median (black bar), lower-quartile, and minimum values, respectively, and the individual points are outliers. ***, ** and * mark statistical significance of Anova test at $P<0.001$, $P<0.01$ and $P<0.05$, respectively.

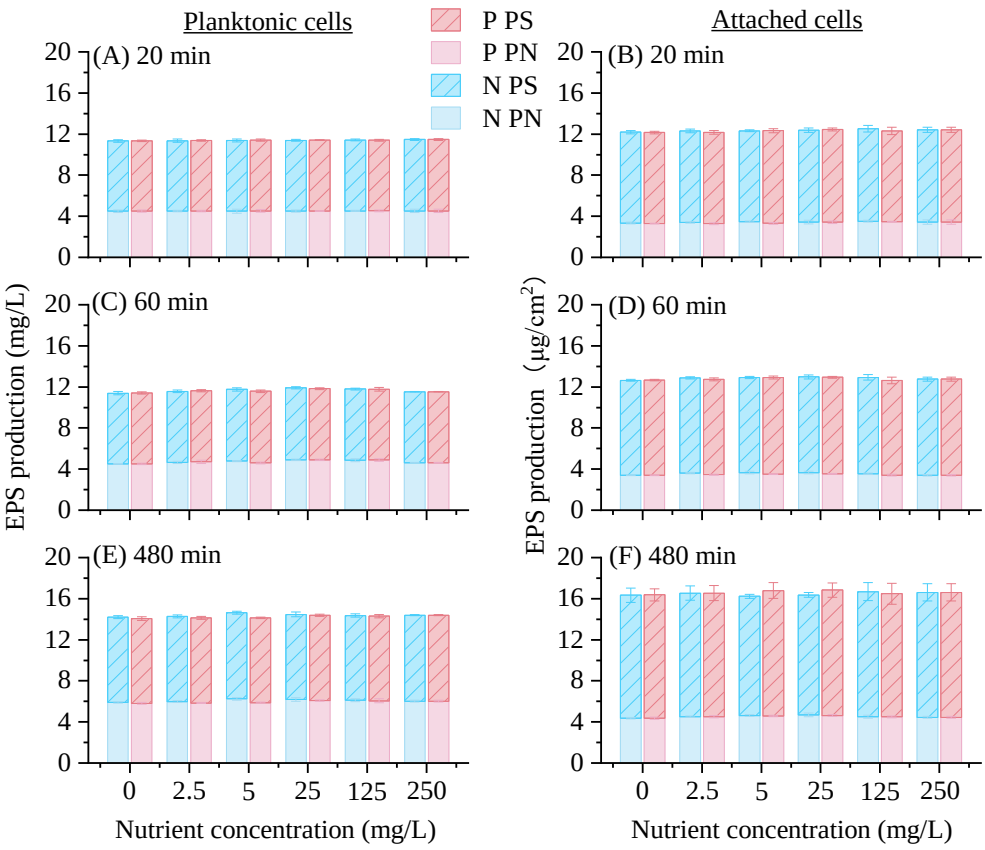

Fig. 5 Extracellular polysaccharide (PS) and protein (PN) excretion (Mean ± SD, n = 3) of planktonic (A, C, and E) and attached (B, D, and F) *C. microsphaera* cells at various initial nitrate (blue) or phosphate (pink) concentrations at 20 min, 60 min and 480 min after incubation.

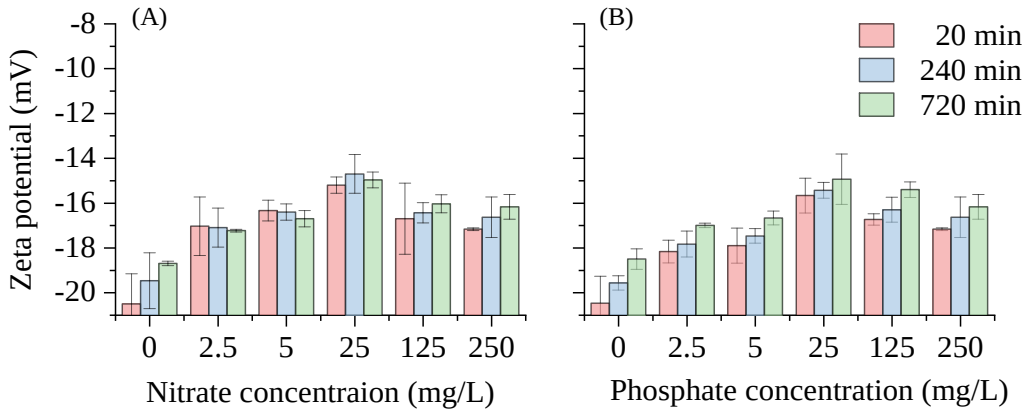

Fig. 6 Zeta potential profiles (Mean ± SD, n = 3) at various initial nitrate (A) or phosphate (B) concentration at 20 min, 240 min and 720 min after incubation.

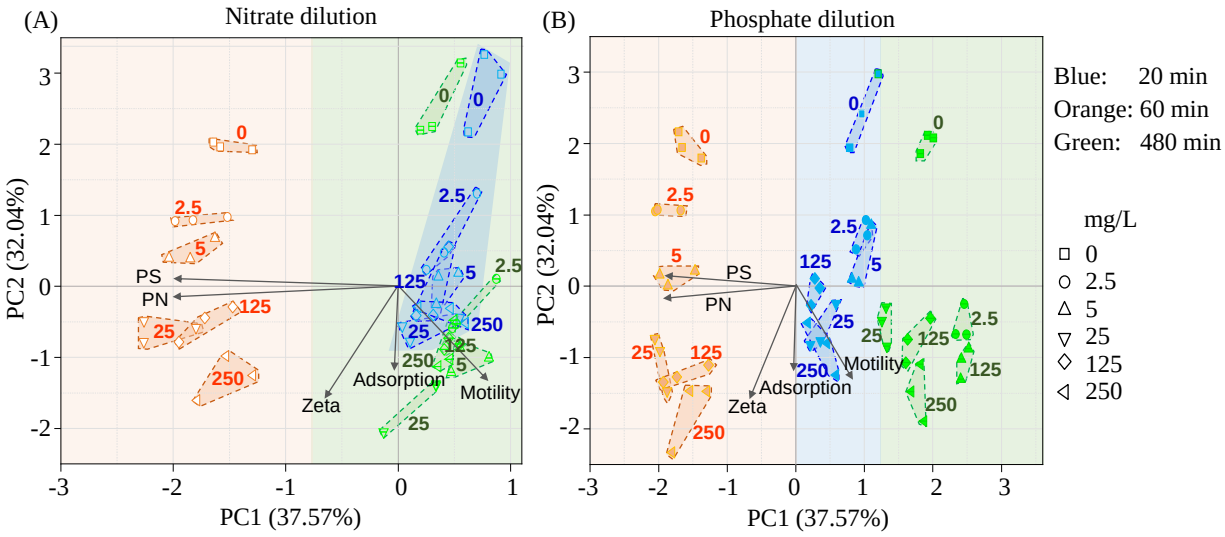

Fig. 7 Principal component analysis (PCA) of the multivariate variation among samples at various initial nitrate (A) and phosphate (B) concentrations at different times after inoculation. Vectors indicate the direction and strength of each variable to the overall distribution. PS, polysaccharide concentration; PN, extracellular protein concentration; Adsorption, nitrate or phosphate adsorption onto electrode; Zeta, zeta potential in the electrochemical system; Motility, cell velocity.