

### Growth effect of microalgae in an algae–bacteria coculture system

For *P. tricornutum*, the maximum algal cells of the coculture with *Sulfitobacter pseudo-nitzschiae* strain H46 was higher than that of the algal culture on Day 14 (unpaired *t* test:  $p = 0.121$ ,  $t = 1.22$ ,  $df = 14$ ). For *C. closterium*, this phenomenon was observed on Day 12 (unpaired *t* test:  $p = 0.378$ ,  $t = 0.316$ ,  $df = 14$ ). For *H. akashiwo*, the co-culture presented a lower algal cell counts but a higher growth rate on Day 12 and 14 (unpaired *t* test:  $p = 0.220$ ,  $t = 0.796$ ,  $df = 14$ ). In addition, the growth of both the co-culture and algal culture of *H. akashiwo* did not reach a peak on day 14.

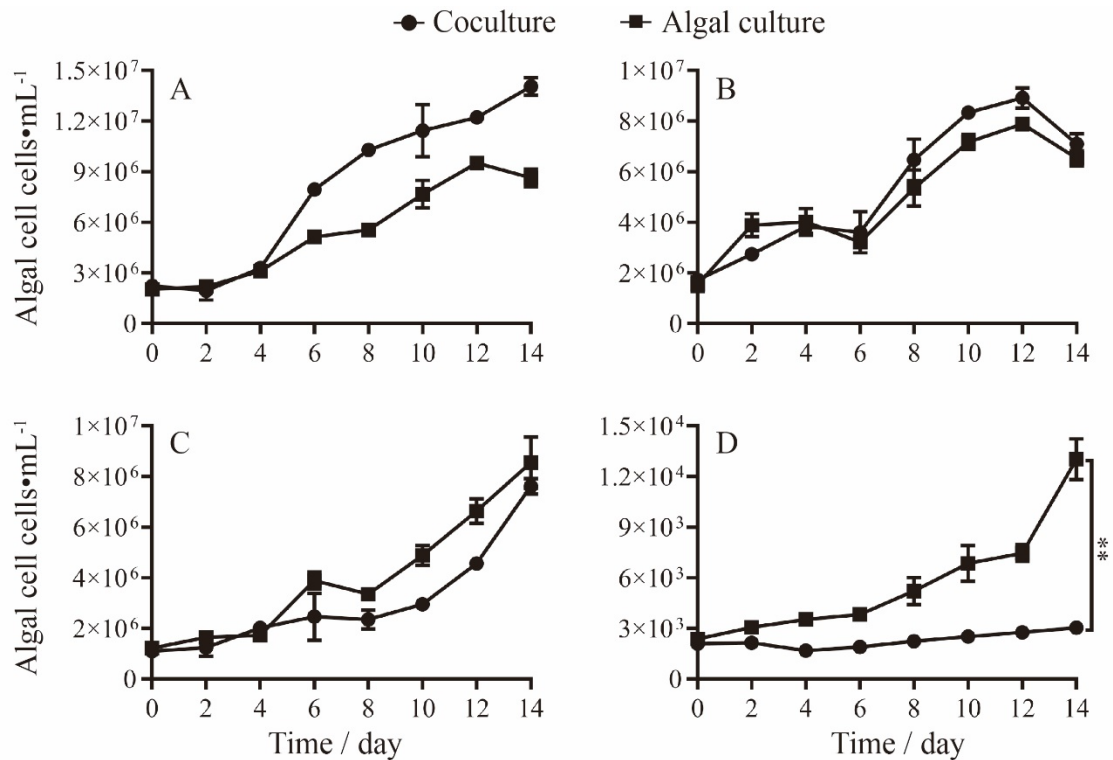


Fig. S1. Growth effects of microalgae cocultured with *Sulfitobacter pseudo-nitzschiae* strain H46 in f/2 medium. The control group was algal culture of each microalgae without H46. Algal cells were counted under a microscope for 14 days. Growth curves for (A) *P. tricornutum*, (B) *C. closterium*, (C) *H. akashiwo* and (D) *C. marina*. The different significance was calculated between co-culture and algal culture of each microalgae. (\*\*  $p < 0.01$ ).

### Growth effect of IAA on microalgae

When cultivated in an IAA environment, *P. tricornutum*, *C. closterium*, and *H. akashiwo* exhibited algal cell count increases, especially for *P. tricornutum* (unpaired *t* test:  $p = 0.189$ ,  $t = 0.910$ ,  $df = 14$ ) and *H. akashiwo* (unpaired *t* test:  $p = 0.230$ ,  $t = 0.759$ ,  $df = 14$ ), whose algal cell counts were higher than those of the algal culture. The algal cell counts of *C. closterium* in the IAA treatment were not higher than that in the algal culture (unpaired *t* test:  $p = 0.499$ ,  $t = 0.001$ ,  $df = 14$ ).

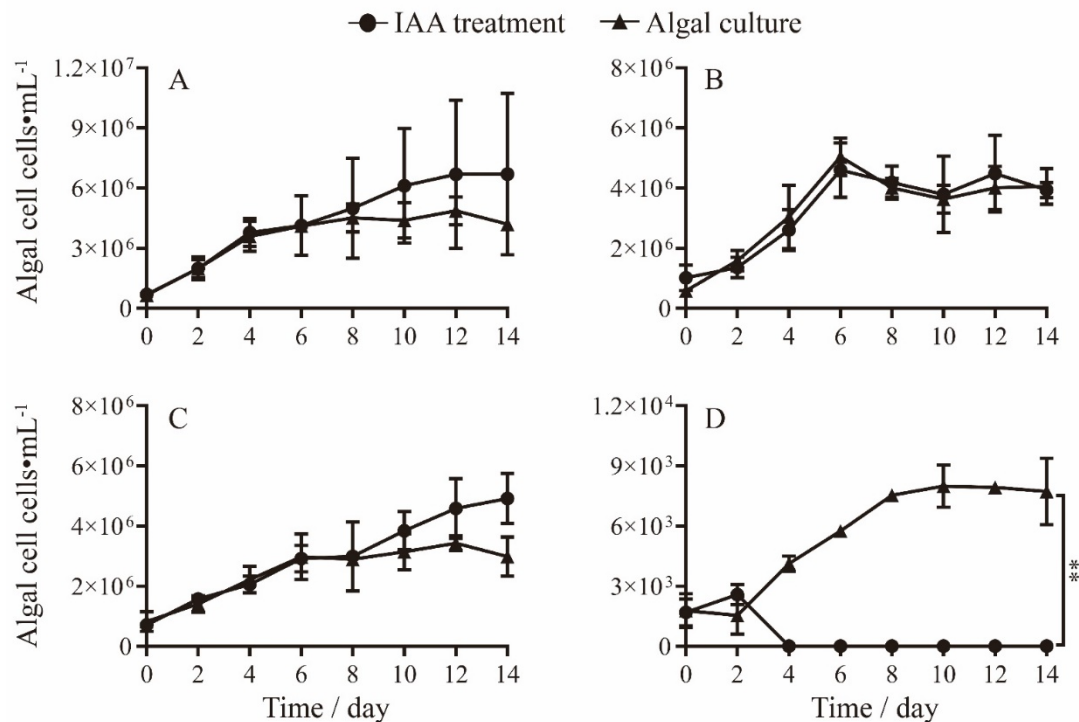


Fig. S2. Growth effects of IAA on microalgae. Two treatments were performed for each microalgal species: IAA treatment and algal culture treatment. IAA treatment was carried out in f/2 medium supplied with  $300 \text{ ng mL}^{-1}$  IAA, whereas algal culture was performed only in f/2 medium. Algal cells were counted under a microscope for 14 days. Growth curves for (A) *P. tricornutum*, (B) *C. closterium*, (C) *H. akashiwo*, and (D) *C. marina*. The difference significance was calculated between IAA treatment group and algal culture group of each microalgae. (\*\*  $p < 0.01$ ).

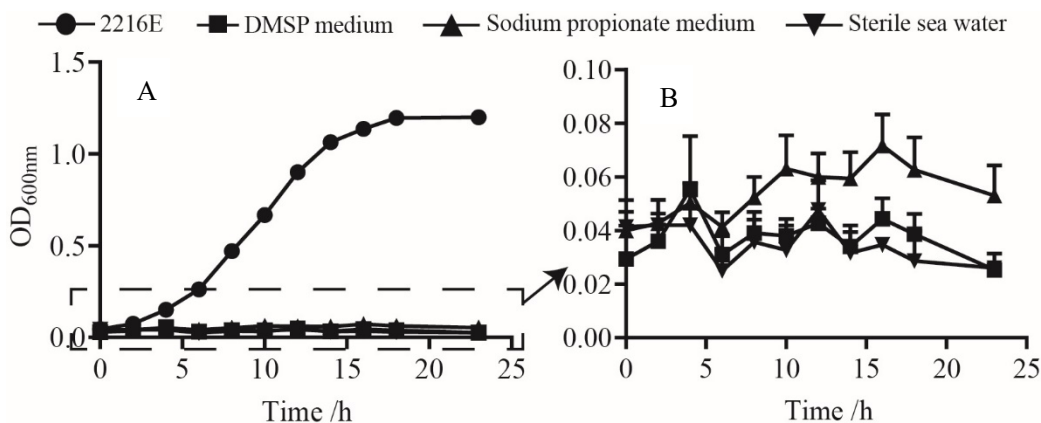


Fig. S3. Growth curve of H46 in different culture media. Detection of  $OD_{600nm}$  in 24 hours culture period. (A) Growth curve for H46 in different media. (B) Detailed H46 growth curves in different media (dashed box in A). (●) 2216E medium, (■) DMSP medium, (▲) Sodium propionate medium, and (▼) sterile sea water.