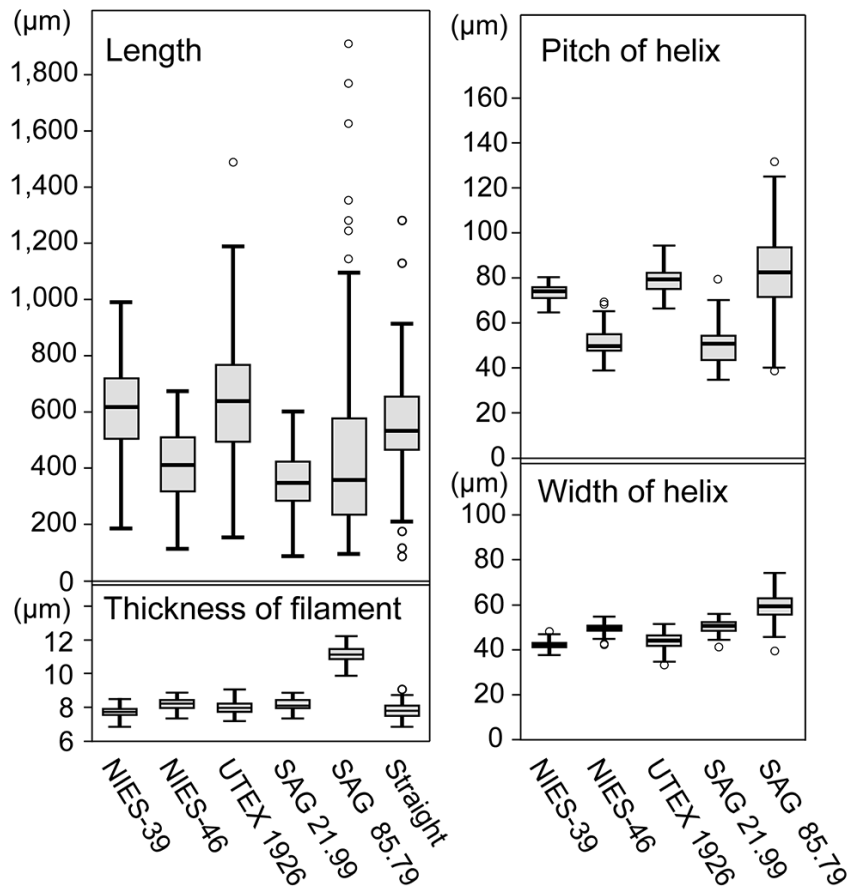


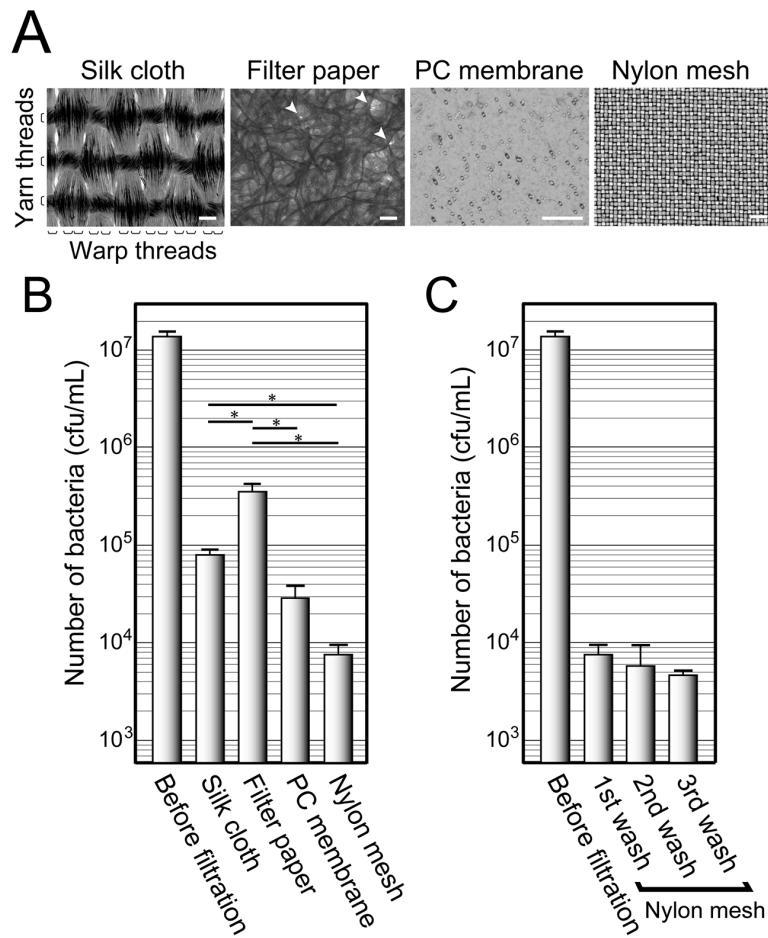
Supplemental Fig. 1 *Arthrospira* strains used in this study.

Notes: Scale bars represent 100 μm.



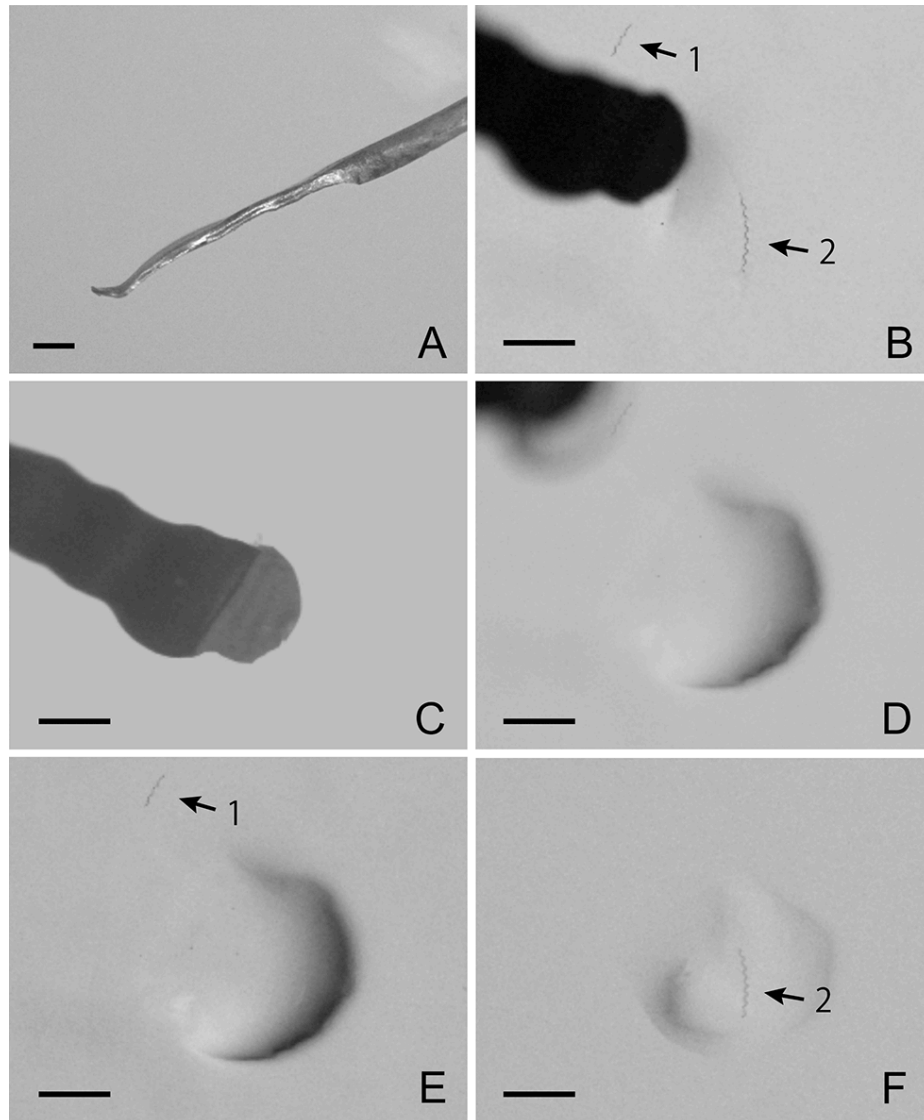
Supplemental Fig. 2 Trichome sizes and dimensions of various *Arthrospira* strains.

Notes: To determine the sizes and dimensions of trichomes, cell suspensions in the late log phase (culture optical density was 0.5–0.8 at 730 nm) were placed on a solidified SOT medium, and photographs were taken using the Digital Microscope VHX-2000 (Keyence, Osaka) equipped with a VH-Z50L zoom lens (Keyence) before the fluid was completely absorbed into the solidified medium. This prevented the structure deformation of trichomes while keeping them in a horizontal position. The length along the axis, width, and average pitch of the helices of individual trichomes were determined from these digital images. Trichomes shorter than two turns of helices were not used for these measurements, because it was impossible to properly measure their lengths and widths in many cases. To calculate the pitch of the strain SAG 21.99, 1 turn of a helix from each end, which often has an extremely small pitch, was excluded from these measurements. Filament thicknesses were measured on the digital images acquired using the bright-field mode of an All-in-One Microscope BZ-9000 (Keyence). Box plots show medians (lines in the boxes), interquartile ranges (boxes), largest and smallest values that are not outliers (whiskers), and outliers (circles). The numbers of trichomes subjected to the measurement of the length, pitch, and width were as follows: *A. platensis* NIES-39, N = 104; *A. platensis* NIES-46, N = 106; *A. platensis* UTEX 1926, N = 103; *A. platensis* SAG 21.99, N = 108; *A. platensis* SAG 85.79, N = 213; and the straight variant of *A. platensis* NIES-39, N = 171. The filament thickness of each strain was as follows (average \pm SD): NIES-39, $7.6 \pm 0.4 \mu\text{m}$; NIES-46, $8.2 \pm 0.4 \mu\text{m}$; UTEX 1926, $8.0 \pm 0.4 \mu\text{m}$; SAG 21.99, $8.1 \pm 0.3 \mu\text{m}$; SAG 85.79, $11.0 \pm 0.4 \mu\text{m}$; and the straight variant of NIES-39, $7.8 \pm 0.5 \mu\text{m}$. The numbers of trichomes subjected to the measurement of filament thickness were 53, 61, 43, 60, 79, and 48, respectively, for each of the above strains.



Supplemental Fig. 3 Differential filtration of non-axenic culture of *A. platensis* to remove contaminating bacteria. (A) Filter media used. (B) Efficiency of the removal of contaminating bacteria with various filtration media. (C) Effect of repeated washing on nylon mesh.

Notes: Microscopic views of the following filter media are shown in A: silk cloth *habutaé* (Silk cloth); fast-flow quantitative filter paper with a particle retention size of 20 μm (Filter paper); track-etched polycarbonate membrane with pores of 8 μm (PC membrane); and nylon mesh with square openings of 20 μm (Nylon mesh). Arrowheads indicate prominent pores in the filter paper. Bars represent 100 μm . In the experiment in B, a portion of a non-axenic culture (1.2 mL) of *A. platensis* UTEX 1926 was filtered through these filtration media. Trichomes trapped on the filters were then washed with 50 mL of sterile SOT medium. The washed trichomes were suspended in 1.2 mL of the same medium, and cfu of contaminating bacteria before and after the washing were determined. The data for filtered samples represent the averages of five independent filtration experiments beginning with a single non-axenic culture. Horizontal bars with asterisks indicate pairs of filtered samples with significant differences ($p < 0.05$, Steel-Dwass test). In the experiment in C, to determine the effect of repeated washing on nylon mesh, an aliquot (0.9 mL) of the trichome suspension recovered from the nylon mesh in the experiment in B (1st wash) was applied to a fresh nylon mesh, and the trichomes trapped on this mesh were washed with 50 mL of sterile medium. Washed trichomes were resuspended in 0.9 mL of the medium (2nd wash). An aliquot (0.6 mL) was taken from this suspension, and washing it on nylon mesh was repeated once to obtain 0.6 mL of a trichome suspension (3rd wash). Cfus in each suspension were then determined. The data for the repeated washing represent the averages of five independent filtration experiments beginning with a single non-axenic culture. Error bars indicate the standard errors of the means.



Supplemental Fig. 4 Single-trichome manipulation with a microtrowel. (A) Microtrowel made by shaping the end of a platinum wire into a miniature trowel-like structure. (B–E) Serial images that show the scooping action with the microtrowel. (F) Trichome of *A. platensis* UTEX 1926 placed on a new solid medium after scooping up in B–E.

Notes: Trichomes 1 and 2 in (B) correspond to trichome 1 in (E) and trichome 2 in (F), respectively. Scale bars represent 500 μm .

Legend to Supplemental Video

Single-trichome manipulation with a microtrowel. A trichome is scooped up from an agar plate using a microtrowel (00:05–00:12). After exchanging the plate with a new one (00:15–00:25), the trichome is placed on it (00:30–00:35).