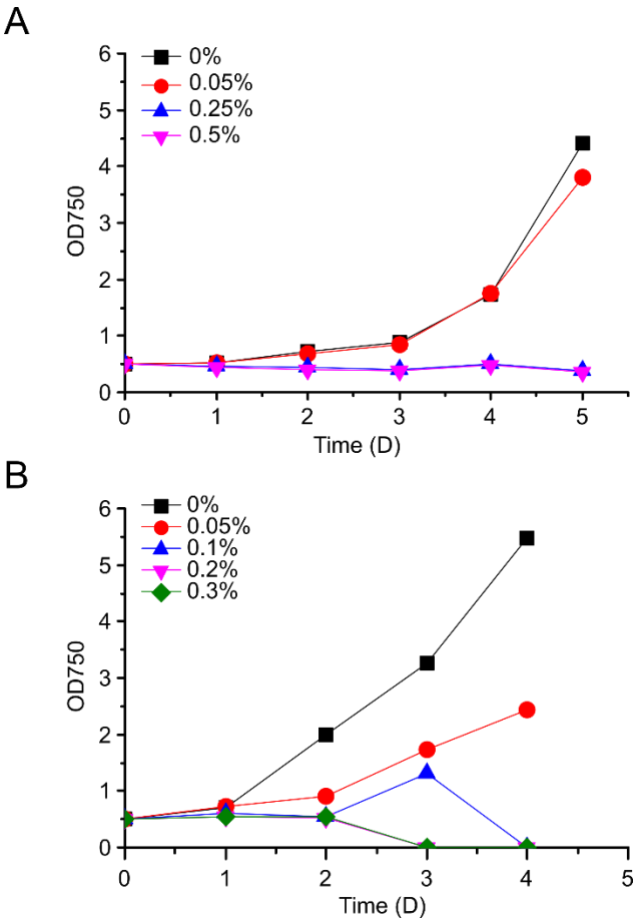
Supplementary information

Investigation of photoinitiator toxicity

To investigate the effect of the photoinitiators LAP and Irgacure 2959 on Synechocystis cells, suspension cultures were grown with different concentrations of each photoinitiator. The cells were inoculated in BG11 medium with initial OD750 0.5. Increasing concentrations of photoinitiators were added to the cultures and were incubated for 4-5 days at 30 °C, with 100 rpm orbital shaking and 1% CO2 under 25 µmol photon m-2 s-1 illumination. LAP was used in the concentrations of 0.05%, 0.1%, 0.2% and 0.3% (w/v), while Irgacure 2959 was used in, 0.05%, 0.25% and 0.5% (w/v) due to its higher recommended concentration for effective crosslinking.

Higher concentrations of LAP (over 0.05%) inhibited the growth of the cells and resulted in the death of the cultures by the 4th day while 0.05% resulted in slower, but steady growth compared to control cultures, without any photoinitiator added (Suppl. Figure 1A). Irgacure 2959 had less sever effect, only inhibiting cell growth in 0.25% and 0.5% concentrations and not resulting in cell death while in 0.05% concentration it only mildly hindered growth during 5 days (Suppl. Figure 1B). Despite the less pronounced inhibitory effect of Irgacure 2959, LAP was chosen as photoinitiator in 0.05% concentration due to its higher effectivity to initiate photo-crosslinking in low concentrations. To test the ability of this low amount of LAP to facilitate crosslinking and to acquire stable films, 0.05% LAP was added to a mixture of alginate (3%), GGMMA (4%) and a low amount of Synechocystis cells. The amount of cells was enough to show a light green colour, but low enough so that the growth of the cells could easily be followed by eye by the darkening of the colour of the films. The formulation was printed on the surface on a Petri dish and crosslinked with 405 nm light with 60 mW cm-2 light for 10 min. The resulting films were elastic and reasonably stable. They were incubated in BG11 medium for a week to assess the viability of the cells and gradual darkening of the green colour was observed indicating satisfactory cell growth.



Suppl. Figure 1 . Effect of different concentrations of photo initiators on the cell growth of Synechocystis. Effects of LAP (A) and Irgacure 2959 (B)