



**Fig S1.** The change in appearance of emulsions (the concentration of lutein-ethanol was 0.5%) in different treatment groups during light exposure. (The order of the samples from left to right is as follows: COB-S-D、POB-S-D、COB-H-D、POB-H-D、COB-U-D、POB-U-D、COB-S-UV、POB-S-UV、COB-H-UV、POB-H-UV、COB-U-UV、POB-U-UV).

Notes: S: Stirring, H: Homogenization, U: Ultrasonication.