

Live and lyophilized fungi-algae pellets as novel biosorbents for gold recovery: Critical parameters, equilibrium, kinetics and regeneration studies

E-supplementary data

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Table S1 Comparison of gold adsorption capacity by fungi-algae pellets with individual algae and fungi and synthesized adsorbents reported in the literature.

Figure S1 Schematic of fungi-algae pelletized reactor for gold recovery from wastewater.

Figure S2 SEM images of live fungi-algae pellets with diameters at (a) 3-4 mm, (b) 6-7mm and (c) 9-10 mm, and lyophilized fungi-algae pellets with diameters at (d) 3-4 mm, (e) 6-7mm and (f) 9-10 mm (Magnification 1000x).

Figure S3 Colour change of live co-pellet before (a) and after (b) adsorption for 3 h, and lyophilized co-pellets before (c) and after (d) adsorption for 6 h.

Figure S4 FTIR spectra of live (a) and lyophilized (b) co-pellets before and after adsorption, and (c) comparison of FTIR spectra of live and lyophilized co-pellets.

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Table S1 Comparison of gold adsorption capacity by fungi-algae pellets with individual algae, fungi and synthesized adsorbents reported in the literature.

| Adsorbent | Size (mm) | Adsorption time (h) | Capacity (mg/g) | Reference |
|--|-------------|---------------------|-----------------|---------------------------------|
| l-lysine modified crosslinked chitosan resin | 0.1–0.2 | 7 | 70.34 | (Fujiwara et al., 2007) |
| proteins immobilized in microcapsules | 0.1 | 1 | 20 | (Kiyoyama et al., 2008) |
| activated carbon derived from apricot stones | 0.3-0.5 | 24 | 30.21 | (Soleimani and Kaghazchi, 2008) |
| alfalfa immobilized on silica polymer | 0.42 – 0.84 | - | 35.97 | (Gamez et al., 2003) |
| ion exchange resin Purolite A-500 | 0.6–0.85 | 0.5 | 147.05 | (Nguyen et al., 2010) |
| ion exchange resin Bonlite BA304 | 0.45–0.70 | 0.5 | 123.4 | (Nguyen et al., 2010) |
| ion exchange resin Amberlite XAD-7HP | 0.56–0.71 | 0.5 | 78.12 | (Nguyen et al., 2010) |
| <i>Fucus vesiculosus</i> | - | 24 | 68.95 | (Mata et al., 2009) |
| <i>Aspergillus niger</i> AHU 7296 | - | 2 | 42.36 | (Nakajima, 2003) |
| raw date pits | 9-10 | 6 | 78 | (Al-Saidi, 2016) |
| live fungi-algae pellets | 9-10 | 6 | 104.17 | this study |
| lyophilized fungi-algae pellets | 9-10 | 6 | 112.36 | this study |

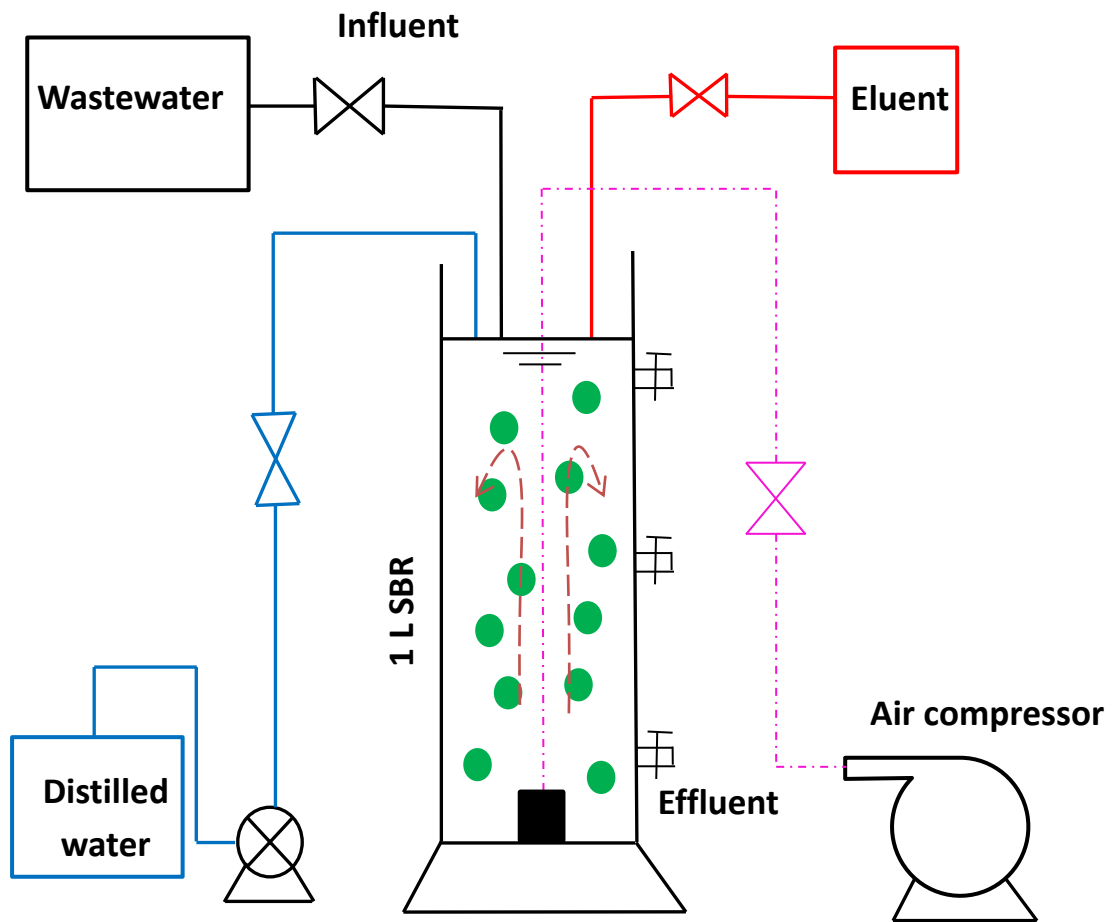
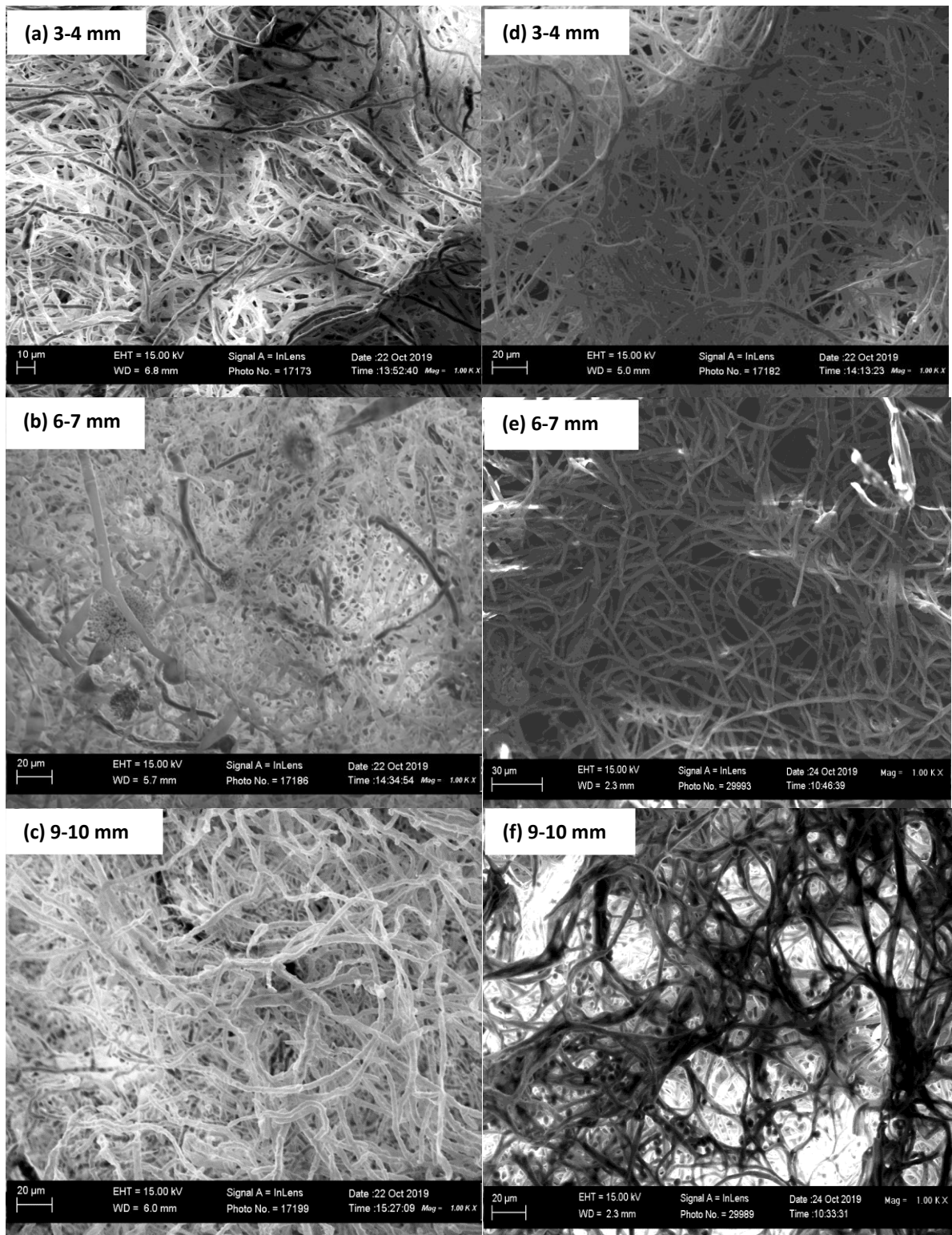


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Live fungi-algae pellets

Lyophilized fungi-algae pellets

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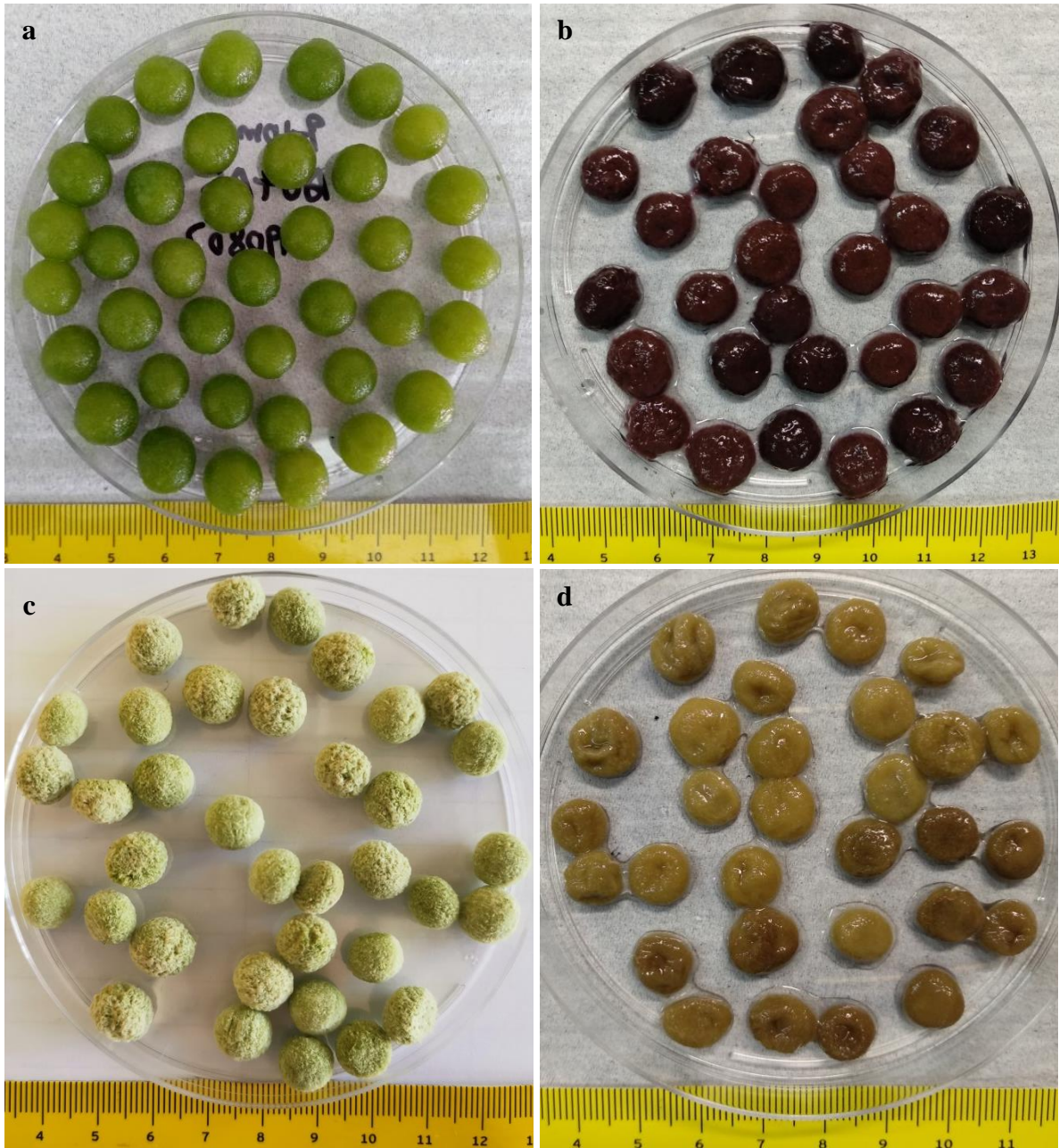


Figure S3 Colour change of live co-pellet before (a) and after (b) adsorption for 3 h, and lyophilized co-pellets before (c) and after (d) adsorption for 6 h.

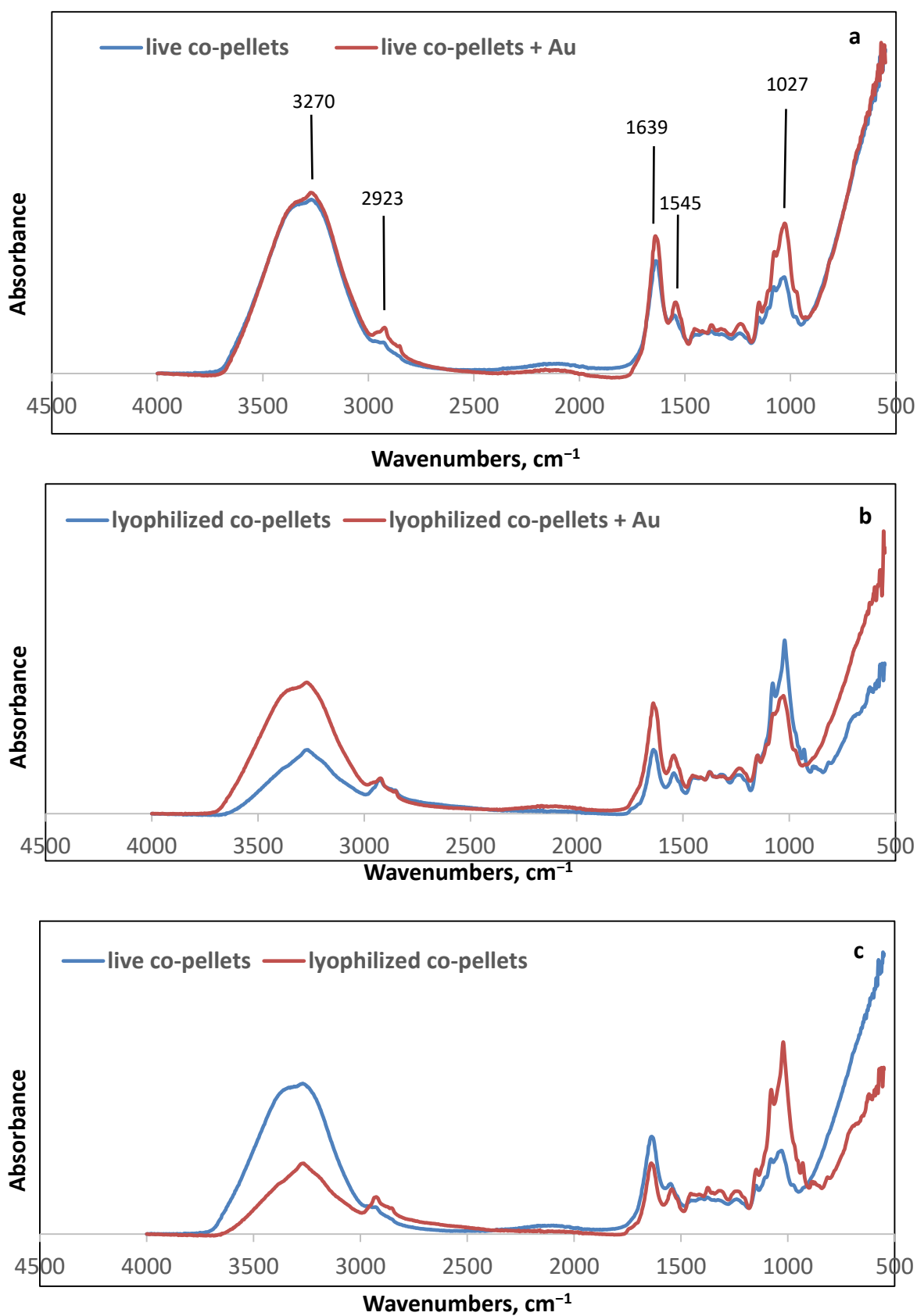


Figure S4 FTIR spectra of live (a) and lyophilized (b) co-pellets before and after adsorption, and (c) comparison of FTIR spectra of live and lyophilized co-pellets.