Cellulose monolithic stir bar for sorptive extraction of glycerol from biodiesel

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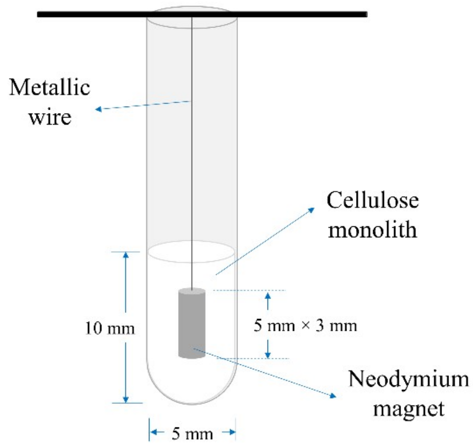

Figure S1. Illustration of the preparation of cellulose monolith stir bar.

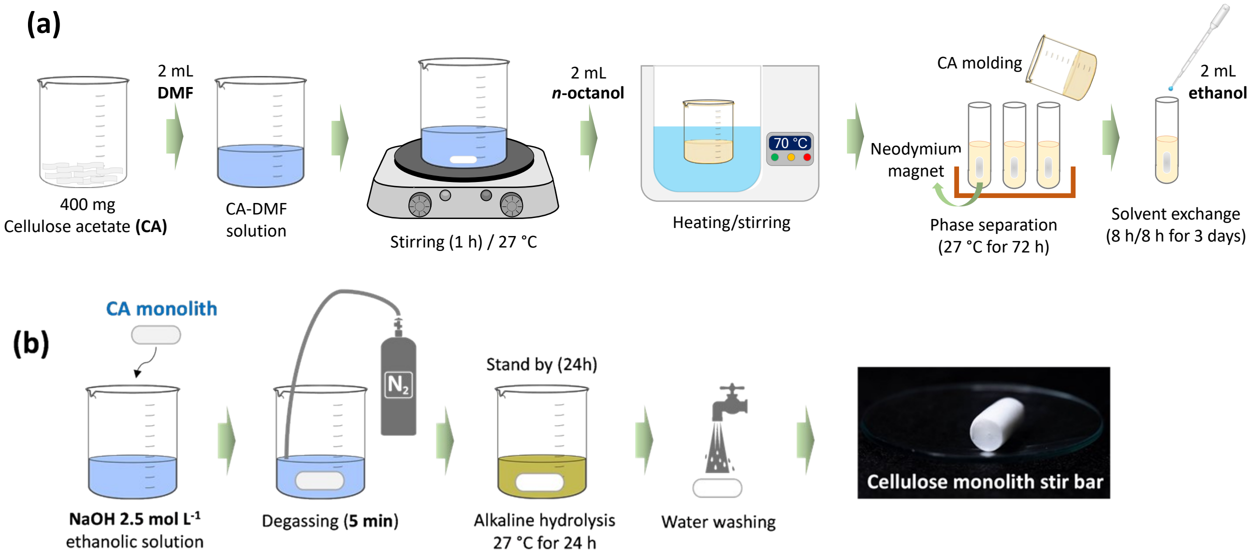

Figure S2. Preparation sketch of the (a) cellulose acetate and (b) cellulose monolith sorptive stir bars.

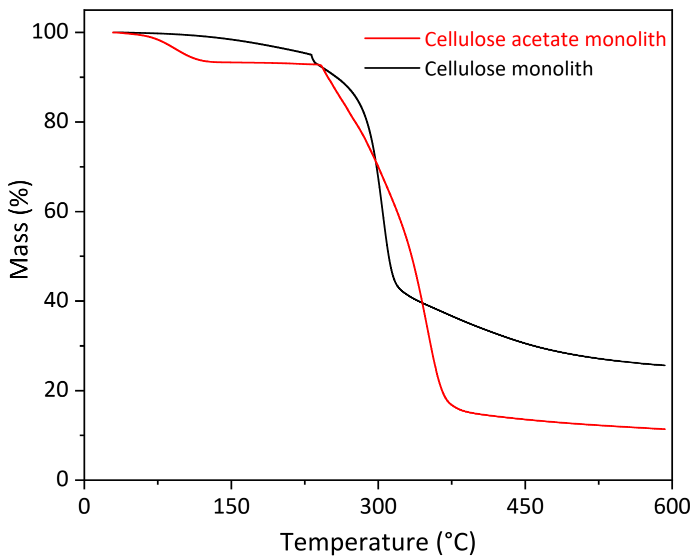

Figure S3. TG curves for the cellulose acetate and cellulose monoliths.

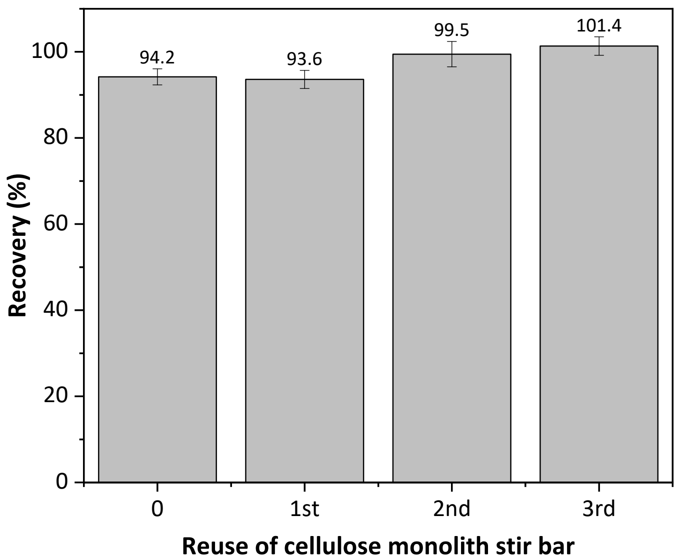

Figure S4. Reuse of monolithic cellulose stir bars in the extraction of glycerol from biodiesel samples by the optimized SBSE method and HPLC-RID analysis.

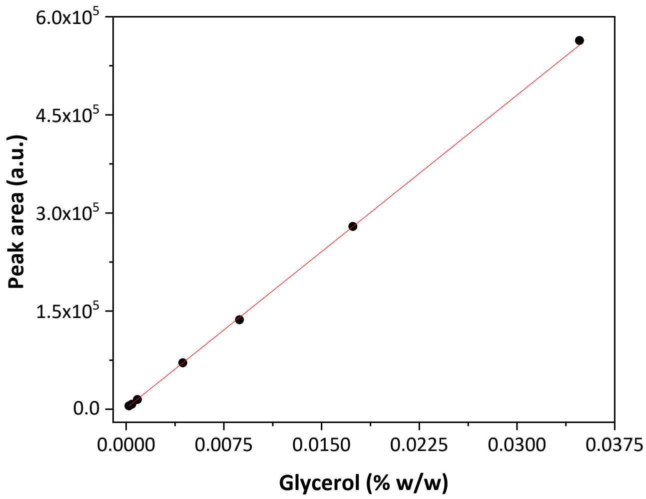

Figure S5. The analytical curve for free glycerol aqueous solution was used using the SBSE-HPLC-RID method with a cellulose monolith stir bar.

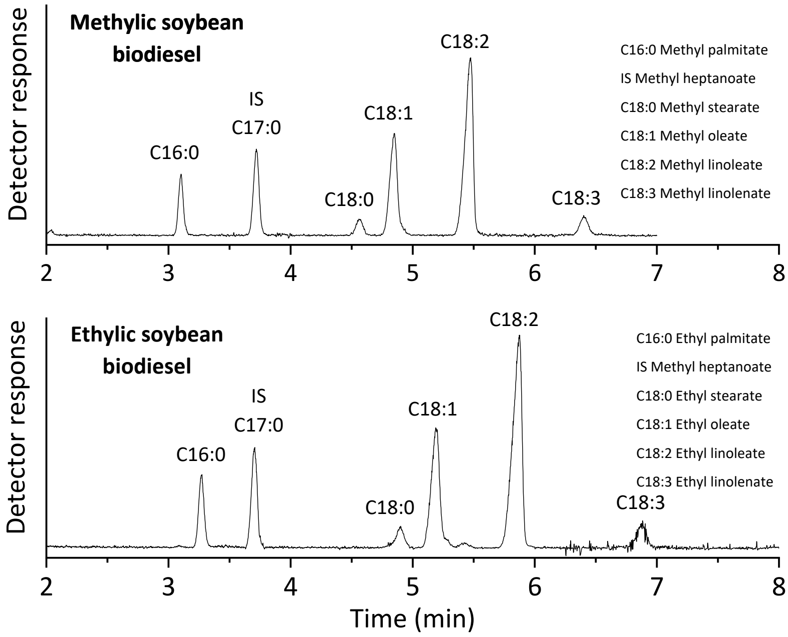

Figure S6. Chromatogram of fatty acid (a) methyl and (b) ethyl esters from methylic and ethylic soybean biodiesel, respectively. Conditions: Capillary column Carbowax 20M bonded 30 m × 0.32 mm ID × 0.25 µm d_f; Column temperature: 190 °C; Carrier gas: Helium; Flow rate: 1.0 mL min^{-1}; Injection temperature: 250 °C; Split ratio: 1:50; Flame ionization detector: 250 °C.

Table S1. Characterization of biodiesel (B100) samples.

Biodiesel (B100) samples	Composition (%)					Total FA[a] esters (% w/w)
	C16:0	C18:0	C18:1	C18:2	C18:3	
Methylic soybean	10.1	4.1	27.9	52.3	5.6	99.3
Ethylic soybean	10.4	4.3	28.4	51.4	5.5	99.0
EN14214 specifications (% w/w)[1]					< 12	> 96.5

[a] FA: Fatty acid

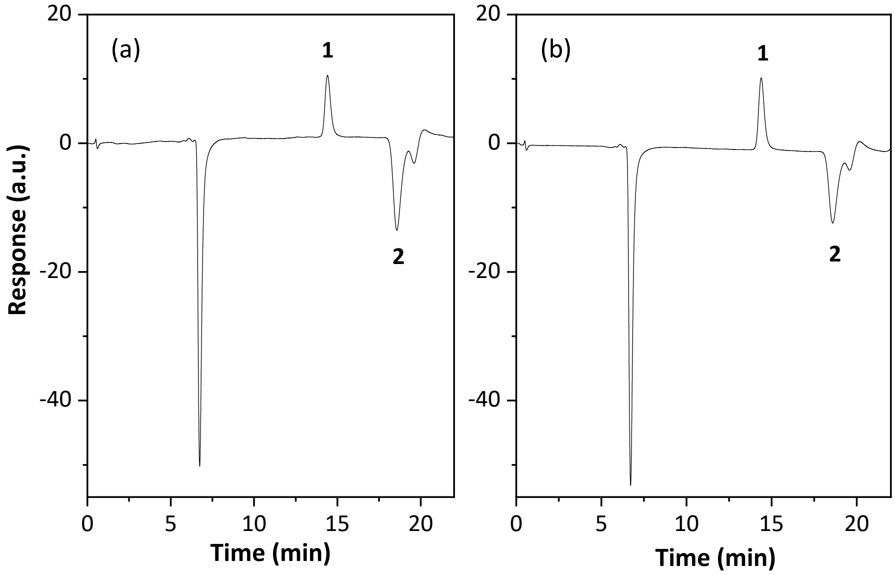

Figure S7. Chromatograms of (a) methylic and (b) ethylic biodiesel extracts obtained by SBSE method using the CMSB. Conditions: Aminex HPX-87H column (300 mm × 7.6 mm ID, 9 µm particle size, 8 % cross-linkage) at 35 °C; Mobile phase: 5.0 mmol L^{-1} H_2SO_4, flow rate 0.6 mL min^{-1}; refractive index detector at 35 °C. Peak identifications: 1- glycerol, 2- fatty acid esters.

References

1 EN14214. Automotive fuels–fatty acid methyl esters (FAME) for diesel engines—requirements and test methods. Berlin, Germany: Beuth-Verlag, 2003.