

Preparation of sulfonated carbon-based catalysts from murumuru kernel shell and their performance in the esterification reaction

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Table S1. Fatty acid composition of SFAD, PFAD and CFAD.

Fatty acid	Composition (wt%)		
	SFAD	PFAD	CFAD
Lauric (C12:0)	-	2.4	52.6
Myristic (C14:0)	-	1.4	22.2
Palmitic (C16:0)	12.6	50.4	13.0
Stearic (C18:0)	3.6	4.8	12.2
Oleic (C18:1)	28.7	35.0	-
Linoleic (C18:2)	50.8	6.0	-
Linolenic (C18:3)	4.3	-	-
Total Saturated	16.2	59.0	100
Total Unsaturated	83.8	41.0	-

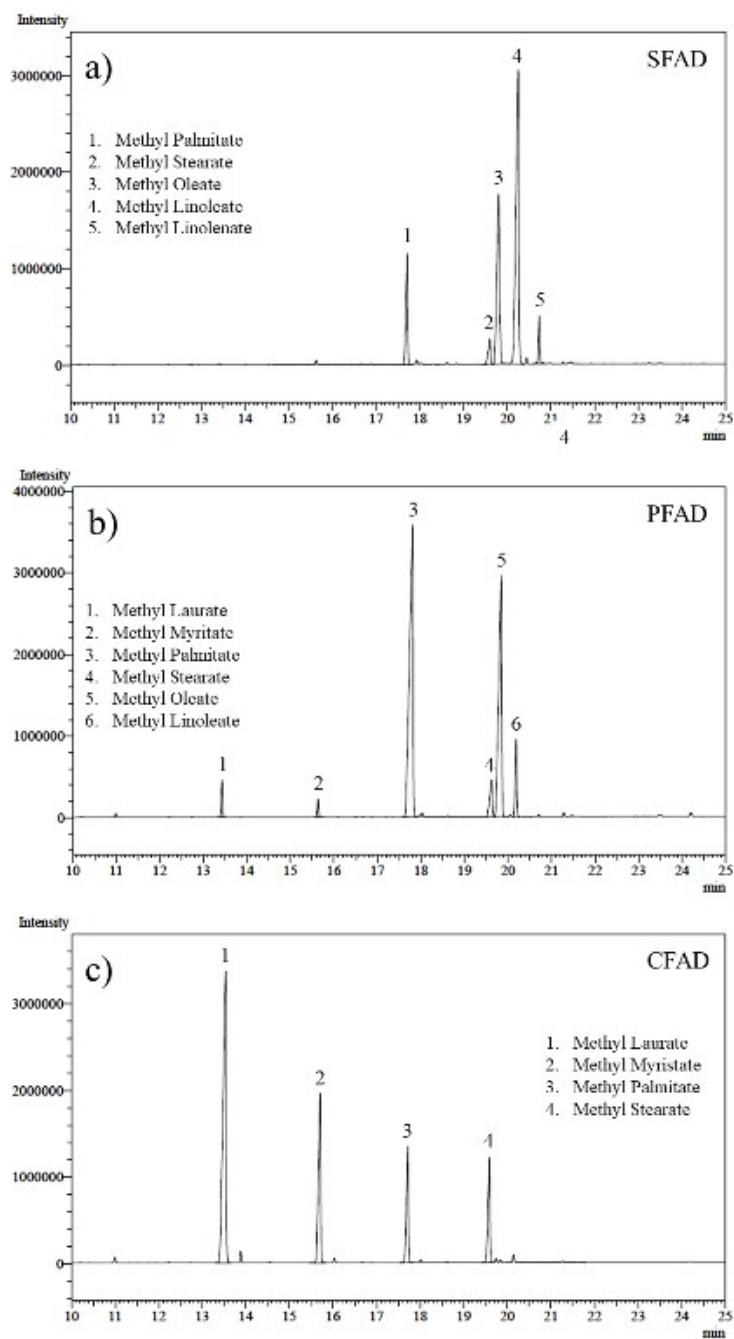


Fig. S1. Fatty acid profile of raw materials (a) SFAD, (b) PFAD and (c) CFAD.

Ester content determination

Analysis parameters

The ester contents was determined according to the European standard EN 14103, by gas chromatography using heptane as solvent and methyl heptadecanoate as internal standard in a gas chromatograph (GC) Shimadzu, model CG-2010, equipped with a flame ionization detector (FID), capillary column TG-WASMS (30 m length, 0.32 mm diameter, and 0.25 μm film). The mobile phase used was helium gas with a flow rate of 1 mL min⁻¹ and an injection volume of 1 μL .

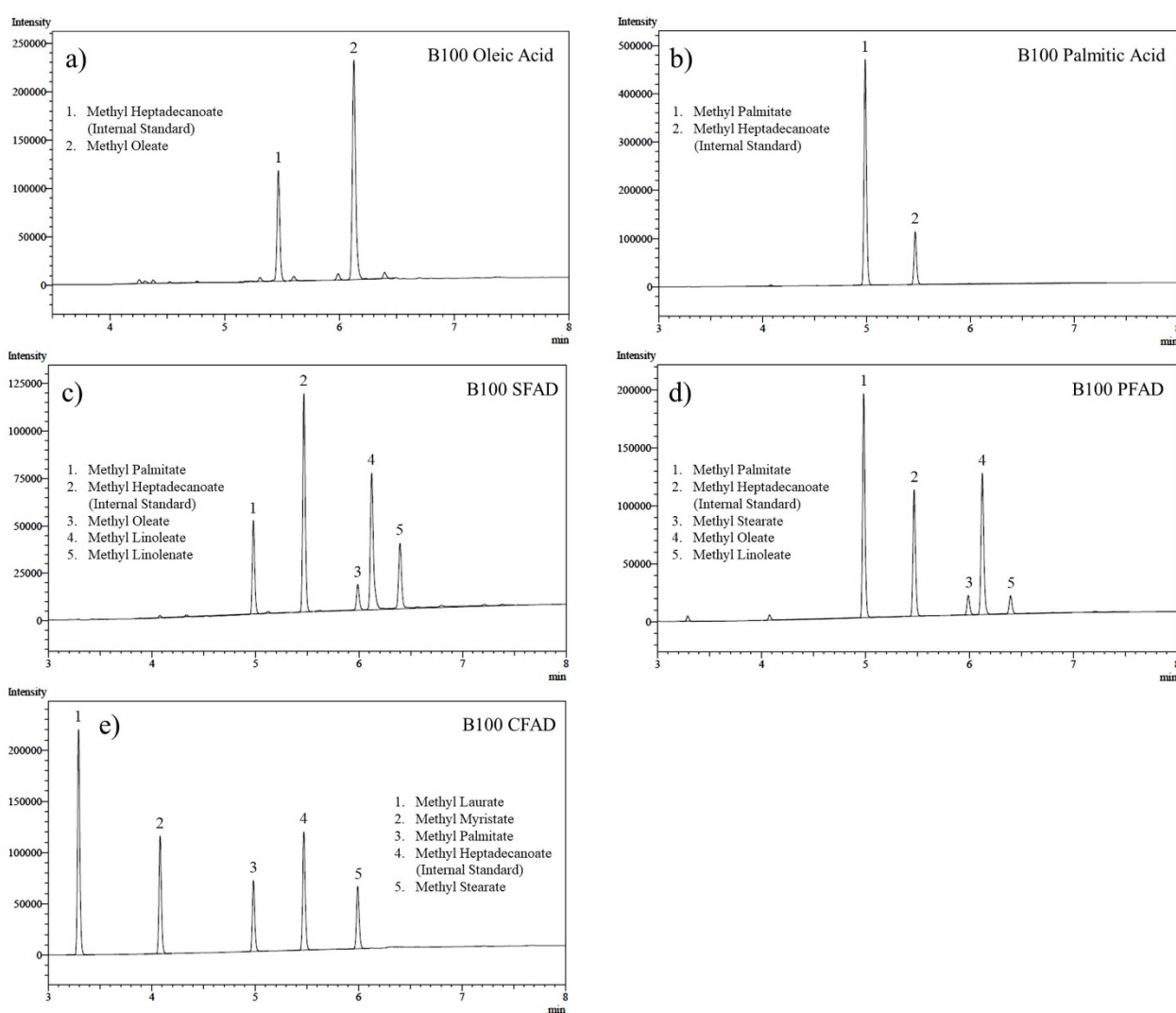


Fig. S2. Biodiesel samples chromatograms, (a) B100 oleic acid, (b) B100 Palmitic acid, (c) B100 SFAD, (d) B100 PFAD and (e) CFAD.