Table S1. Detection processes of fatty acids in CJCO and JNIO.

Step 1: Sample extraction: Add 4 ml of a methanol / CH2Cl2 (1: 3) mixed solution to an appropriate amount of *Jatropha curcas* seed oil and shake well followed by ultrasonication for 10 min at a constant temperature (below 30 °C). Then the mixture was centrifuged at 1800rpm for 10min. The supernatant was collected and the centrifugation was repeated thrice. The solutions were then evaporated to dryness by nitrogen. Step 2: Saponification of the extract: Add 3 mL of 6% KOH in methanol (6 g KOH / methanol in 118 mL), followed by 10 min sonication and repeat the sonication step 3 times, and kept at room temperature for overnight (close the cap tightly) for alkaline hydrolysis. Add 2 mL of hexane into the mixture and sonicate for 10 min, followed by centrifugation. Discard the upper n-hexane extract, and repeat the centrifugation 3 times. The solution was adjusted to pH <2 using 1 mL of 4N HCl. Then the mixture was extracted three times with 2 mL of n-hexane. Step 3: Derivation of fatty acids: Transfer the above extract to a glass tube with a cover, air dry with nitrogen. Add 2mL of BF3-MeOH, flush the space above the glass tube with nitrogen, and close the cover and kept at 90 °C for 2 h. Sample was allowed to cool at room temperature and add about 1 ml of 5% NaCl solution. Then extract 3 times with 2 ml of n-hexane, and transfer the extract to a 2 mL tubes, air dry with nitrogen. Step 4: Chromatographic detection and conditions: Column: Thermo TG-5MS 30m x 0.25mm x 0.25μm Heating program: 80 °C starting temperature, hold for 1 minute; 10 °C/ min to 200 °C, 5 °C / min to 225 °C, 2 °C / min to 250 °C, and hold for 5min. Transmission line temperature: 280 °C Ion source temperature: 280 ° C Inlet temperature: 290 ° C Helium, constant current mode, flow rate: 1.2mL / min. Scanning range: 30–400 Injection volume: 1 μL. Detection limit: 0.02 mg/kg Step 5: Statistical analysis: The fatty acid content was calculated using the external standard and the internal standard.

Table S2. Descriptive Statistics of CJCO and JNIO properties.

Property	CJCO		JNIO	
	Average	SD [1]	Average	SD
Water content	569.00	3.60	192.60	3.05
Dissipation factor	0.67	0.02	0.10	0.01
Breakdown voltage	55.40	1.25	72.36	1.00
Flash point	236.00	4.58	295.00	2.65
Fire point	308.00	5.29	319.66	6.02
Viscosity at 40°C	32.86	0.95	32.83	0.56
Viscosity at 100°C	7.38	0.05	7.46	0.08
Pour Point	−2.33	0.58	−10.00	1.00
Relative Density	0.91	0.004	0.91	0.007
Total acid content	9.34	0.06	0.012	0.001

[1] SD: Standard Deviation

Table S3. ANOVA of differences in physical and chemical properties between CJCO and JNIO.

Property	SS	df	MS	F	P-value
**Water content	212,440.167	1	212,440	19,024.49	1.657×10^-8
**Dissipation factor	0.48166667	1	0.4816	1806.25	1.832×10^-6
**Breakdown voltage	431.801667	1	431.80	335.59	5.223×10^-5
**Flash point	5221.5	1	5221.5	372.96	4.237×10^-5
Fire point	204.166667	1	204.16	6.34	0.065
Viscosity at 40 °C	0.00201667	1	0.0020	0.0033	0.957
Viscosity at 100 °C	0.00921984	1	0.0092	1.8948	0.241
**Pour Point	88.1666667	1	88.166	132.25	3.264×10^-4
Relative Density	0	1	0	0	1
**Total acid content	130.56402	1	130.56	72488	1.142×10^-9

** indicates that the difference is extremely significant.

Figure S1. The *Jatropha curcas* seed oil treated at 4 ℃ for 48 h (show the precipitated oils).

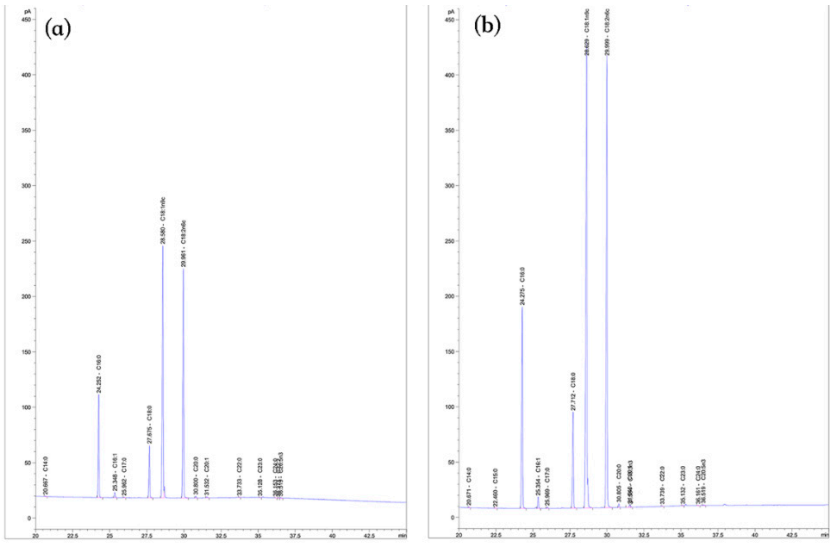

Figure S2. Mass spectrum of fatty acid analysis in CJCO and JNIO (**a**: CJCO, **b**: JNIO).