

Supplementary data

Table S1: Previous literature on Ni-based catalysts on SAF production

Catalyst	Feedstock	Reaction condition	Yield (%)	Reusability cycles	Ref.
Phosphotungstic acid HPW-Ni/MCM-41	Methyl palmitate	H ₂ -2MPa, 390 °C, 6h	86	NA	[249]
Ni/Al-SBA-15	Methyl palmitate	N ₂ - 20 bar, 280 °C, 2 h.	83	NA	[250]
Ni ₂ P/Zr-SBA-15	Jatropha oil	H ₂ - 45 bar, 330 °C, 4 h	61-74	NA	[251]
Ni-BTC/MCM- 41(1,3,5- benzenetricarboxylate)	Methyl palmitate	H ₂ -2MPa, 390 °C, 6h	53	NA	[252]
Ni/NH ₄ -Beta	Palm olein	H ₂ - 30-40 bar, 300-360 °C, 4-8h	>62	NA	[253]
Ni/SiO ₂ -ZrO ₂	Biobased difurfurilydene acetone	H ₂ - 2MPa, 280 °C, 24h	65	NA	[254]
Ni-Fe/ZSM-5/SAPO- 11	Palm oil and triolein	H ₂ -60 bar, 300 °C, 2h	Palm oil- 62 Triolein- 64	NA	[99]
Ni-DOBDC (2,5- dihydroxy terephthalic acid)	Methyl palmitate	CO ₂ - 2MPa, mass ratio of 1:40, 430 °C, 8h	82	NA	[255]
NiMoS/Ti-K	Karanja oil	H ₂ - 30 bar, 350 °C, 6h	>90	NA	[256]
Ni/Beta	Palm olein	H ₂ - 40 bar, 320– 360°C, 5 h	71–74	NA	[257]
Ni/Zeo	Salicornia bigelovii seeds	N ₂ - 80 ml/min, 300-500°C, 10 mins	40-70	NA	[258]
Ni/AC	WCO	N ₂ - 60ml/min, 500 °C, 15 mins	24–85	NA	[259]

Table S2: Literature review on Co-based catalysts for green fuel production

Catalyst	Feedstock	Reaction condition	Yield (%)	Reusability cycles	Ref.
Co/AC	Palm fatty acid distillate	350°C, 1h, 3wt%	~72%	NA	[260]
Co/SBA-15	Palm fatty acid distillate	350°C, 3h, 10wt%	~50	NA	[261]
Co/SBA-15	PFAD	N ₂ - 10 wt%, 350 °C, 2h	Co/SBA-15 (16) Ni-Co/SBA-15 (88)	5	[236]
Co/EAC	Macauba pulp oil	H ₂ - 30 bar, 350 °C, 4 h	98	NA	[262]
Co ₁₀ Mo ₁₀ /AC	PFAD	N ₂ - 3wt%, 350 °C, 1h, 50ml/min	92	6	[261]
Co ₃ O ₄ /Si ₂ O ₃ Al ₂ O ₃	Jatropha and palm oil	H ₂ - 2/30bar, 250/300°C, 6-8h	67-74	NA	[263]
Co-Y	Triolein	Partial vacuum-100mbar, 380 °C, 2h	58	NA	[264]
BOMoCo	Waste cottonseed oil	N ₂ - 500°C, 2 mL min ⁻¹	~60	NA	[265]
Co(10wt.%)-Ag(10wt.%)/AC	Coconut shell waste	N ₂ - 1wt%, 350°C, 2h	92	8	[266]
CoMo/Al ₂ O ₃	Palm empty fruit bunch (PEFB)	H ₂ - 2 MPa, 300-350 °C, 1h, 10wt%	~20	NA	[267]
Co ₅ W ₁₀ /Silica Alumina	Tung oil	N ₂ - 350°C, 2h, 5 wt%	84	4	[268]
Co-Mo/Al ₂ O ₃	Neem seed	N ₂ - 1atm, 350–550 °C, 30–240 min	47-53	NA	[269]
CoO-NiO/Kaolin	Coconut oil	N ₂ - 330°C, 2h, 5wt.%	83	NA	[270]