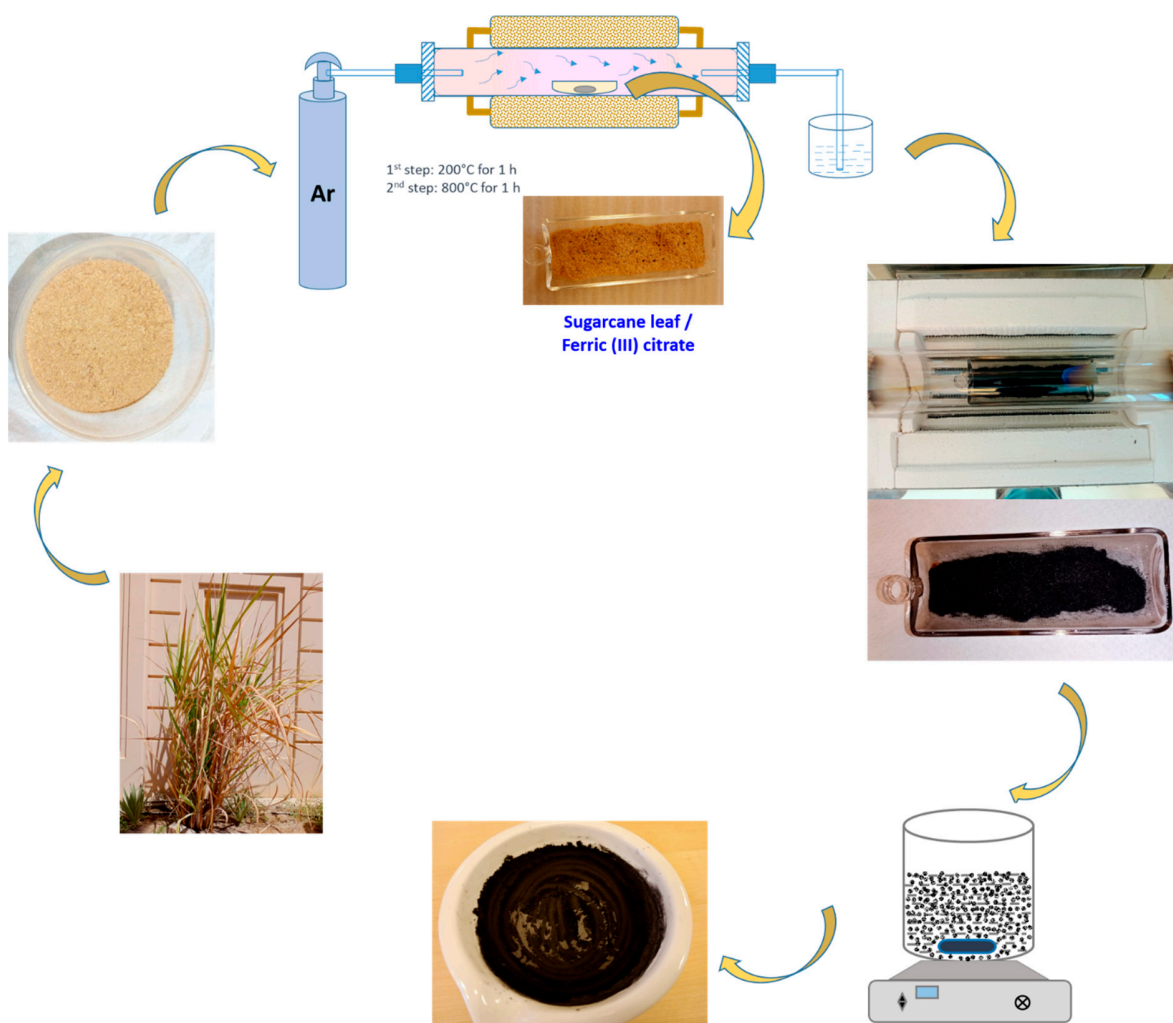


Supplementary information

Table S1. Comparative analysis of GO Synthesis methods and properties reported in the literature.

Synthesis method	Carbon precursor	Reaction time	Reaction temperature (°C)	Oxidizing / Reducing agents	Functional groups	I_D/I_G ratio	Interlayer spacing 'd' (nm)	Reference
Improved Hummers'	Graphite flake	12 h	> 50	H ₂ SO ₄ / H ₃ PO ₄ , KMnO ₄	O-H, C=O, C=C, C-O	NA	0.95	[11]
Modified Hummers'	Graphite flake	13 h	> 35	NaNO ₃ , H ₂ SO ₄ , KMnO ₄ , K ₃ Fe(CN) ₆	O-H, CH ₂ , C=C, C=O, C-O, C-OH	NA	0.77	[80]
Hummers' and improved Hummers' with purification	Graphite powder	7.5 days	40	NaNO ₃ , H ₂ SO ₄ , KMnO ₄	C-O-C, C-O, C=C, C=O, O-H	NA	0.81	[12]
Improved Hummers' with purification	Graphite powder	7.5 days	40	H ₂ SO ₄ , KMnO ₄ , H ₂ O ₂	C-O-C, C-O, C=C, C=O, O-H	0.61	0.831	[81]
Modified Hummers'	Graphite flake	5 h	> 35	H ₂ SO ₄ , KMnO ₄ , K ₂ FeO ₄	-OH, CH ₂ , C=C, C=O, C-O, C-O-C	GO1 -1.07 GO2-0.94	GO1-0.83 GO2-0.81	[82]
Pyrolysis and Hummers' method	Rice straw	4.5 h	450 (Pyrolysis), 45 (Hummer's method)	H ₂ SO ₄ , KMnO ₄	C=C, C=O, O-H, C=C, C-N, C-H, C-N	NA	NA	[7]
Two-stage pyrolysis	Sugarcane dry leaves	9 h	800	H ₂ SO ₄	-OH, CH ₂ , C-O, C=C, C=H, C=O	0.92	0.71	This study



Scheme S1. The processing steps for the preparation of GO from sugarcane dry leaves.