

Introduction

Conventional graphene oxide reducing methods are often associated with significant drawbacks. To address these challenges regarding the graphene oxide reduction, this study proposes a green and eco-friendly approach for the synthesis of reduced graphene oxide (rGO) using *Euphorbia hirta* shoot extract.

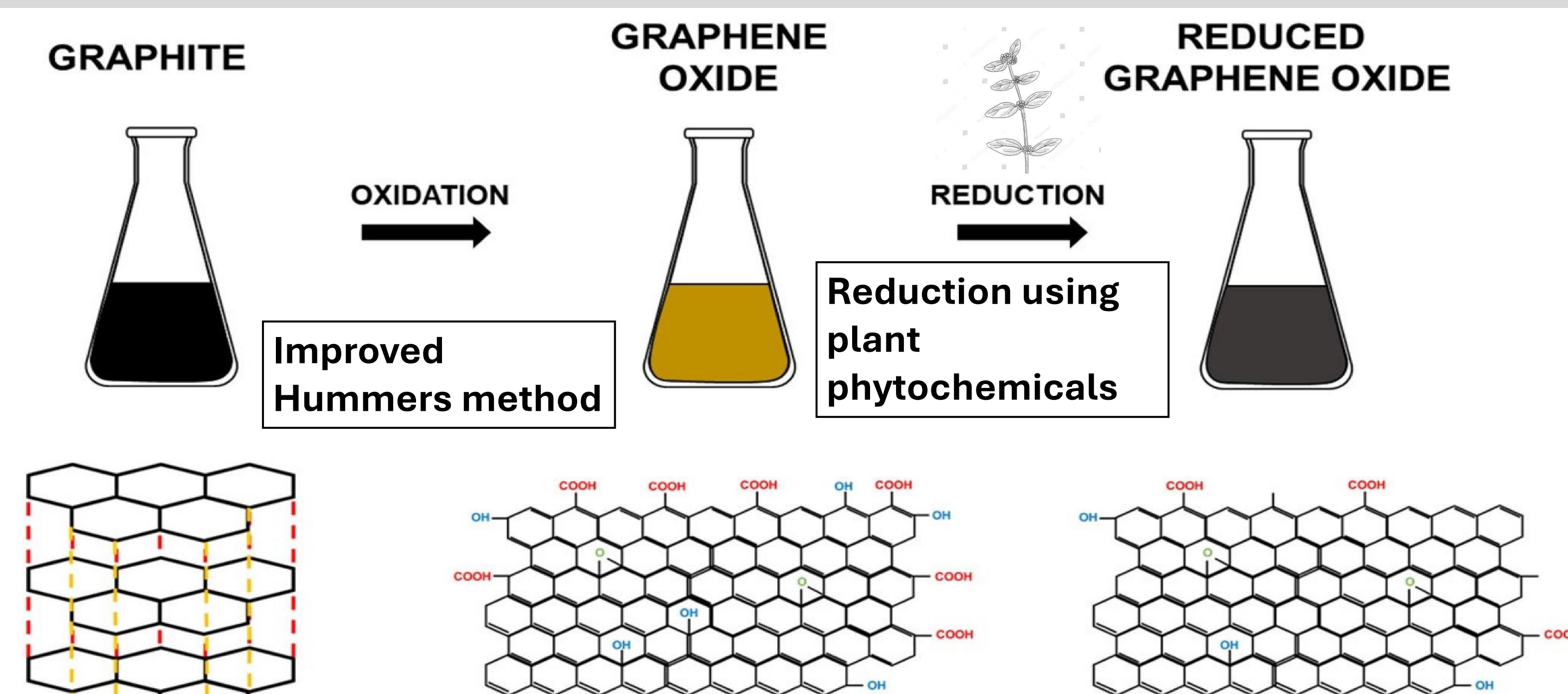


Figure 01. Methodology of synthesizing *Euphorbia hirta*- reduced graphene oxide

SEM image analysis

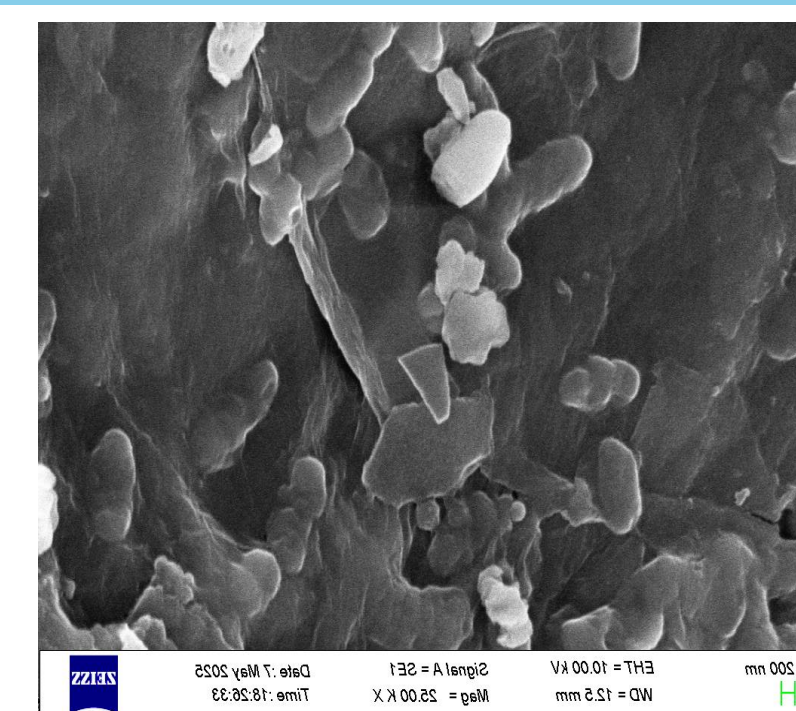
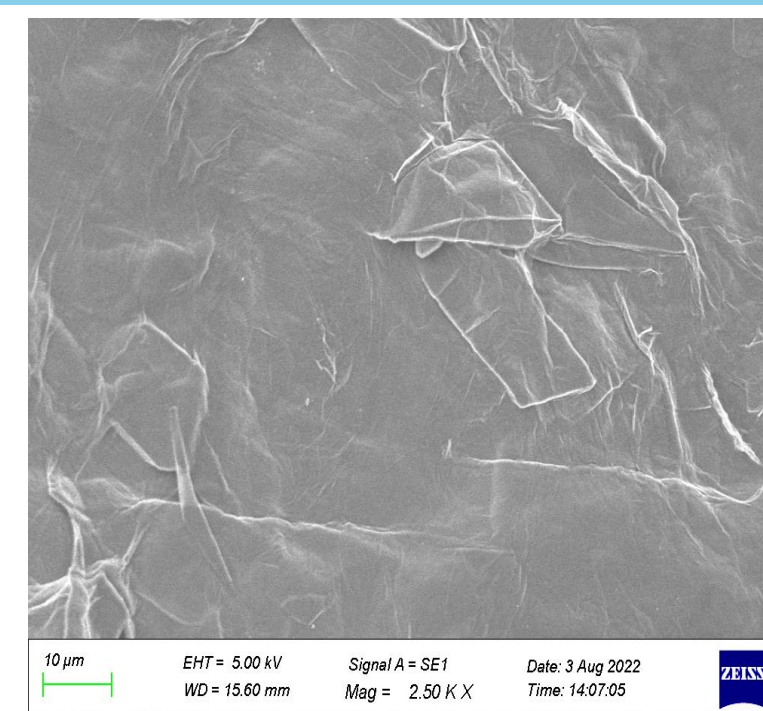
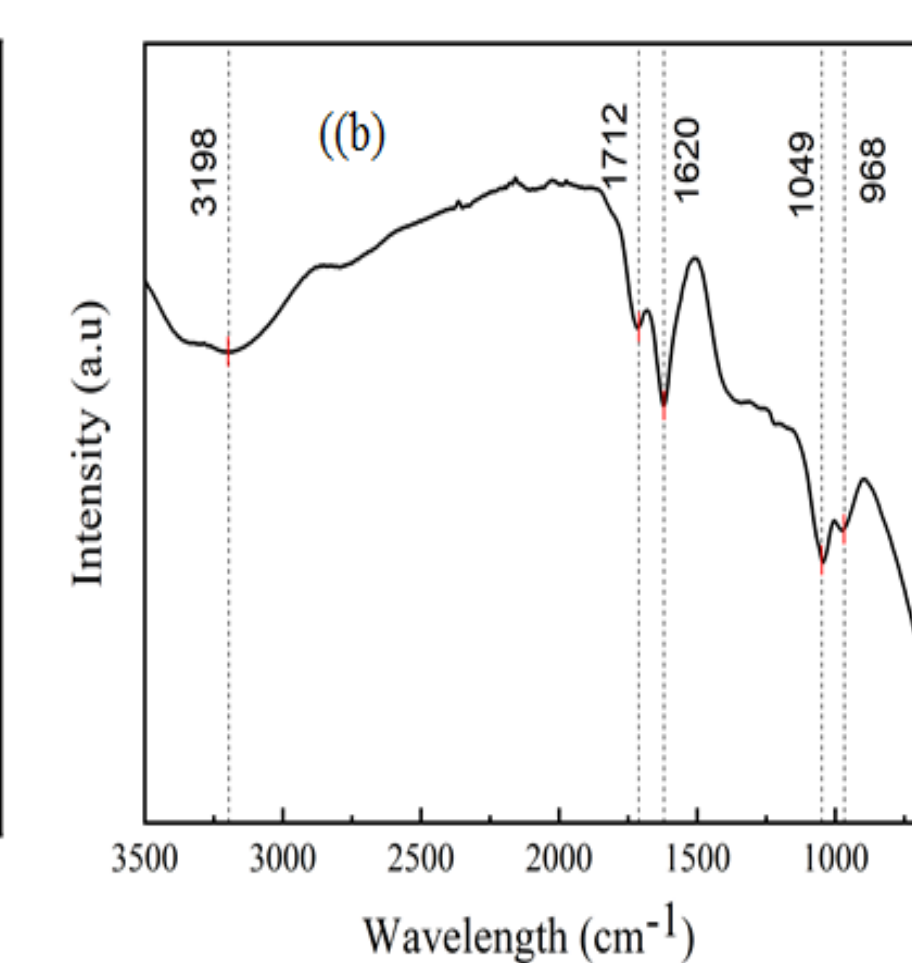
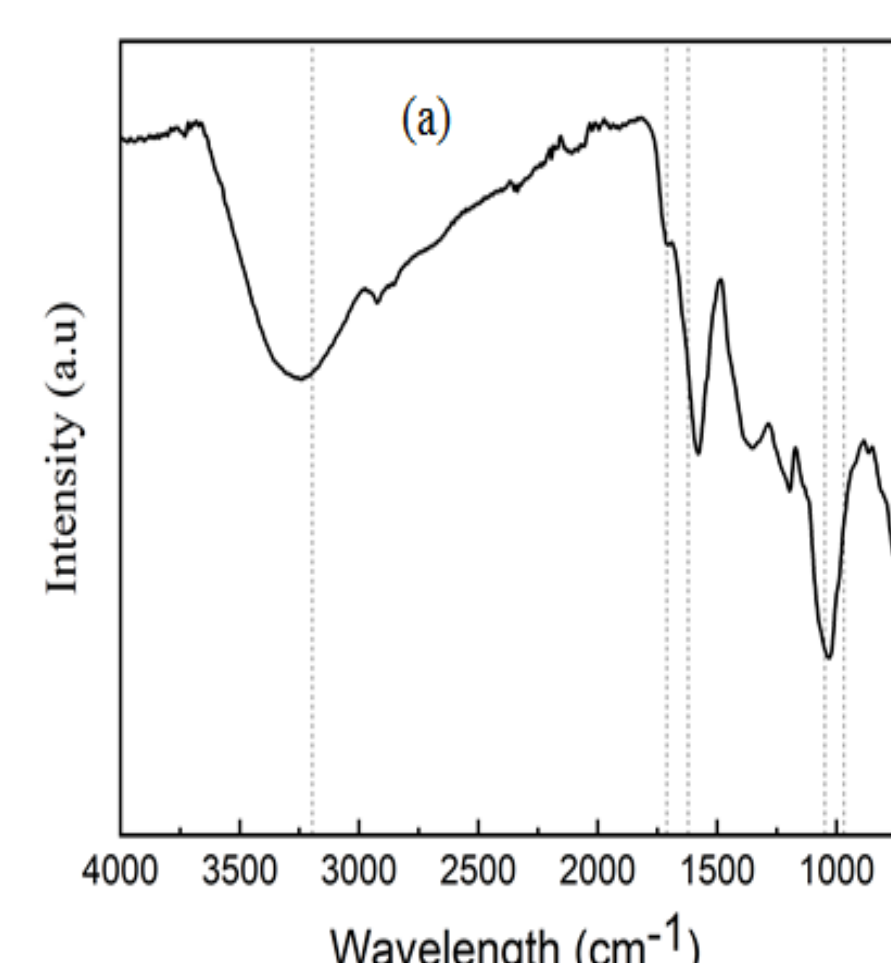


Figure 03. Scanning electron microscope images of rGO. Showing a corrugated silky cloth-like appearance characteristic of rGO.

FTIR Analysis



Functional Group	GO Peak
–OH (hydroxyl)	~3400
C=O (carbonyl/carboxyl)	~1720
C–O–C (epoxy)	~1048

Figure 3. FTIR spectrum of GO and RGO

X ray diffraction pattern analysis

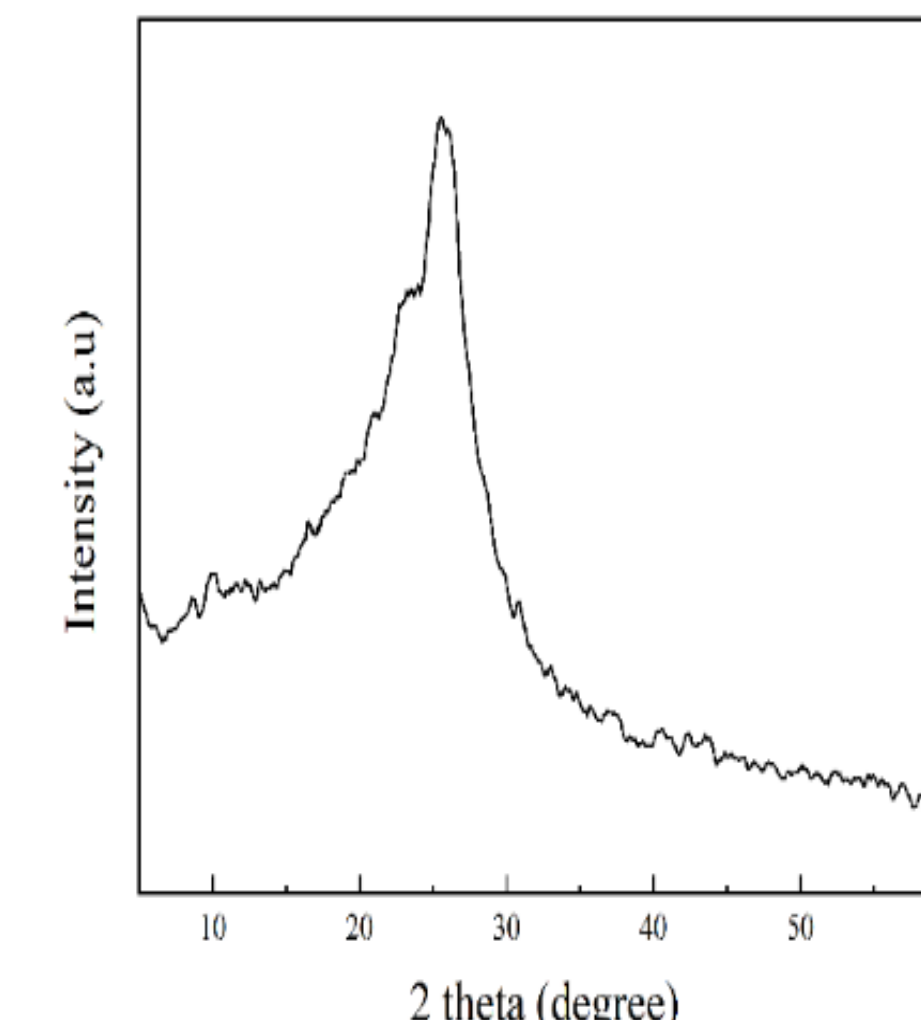
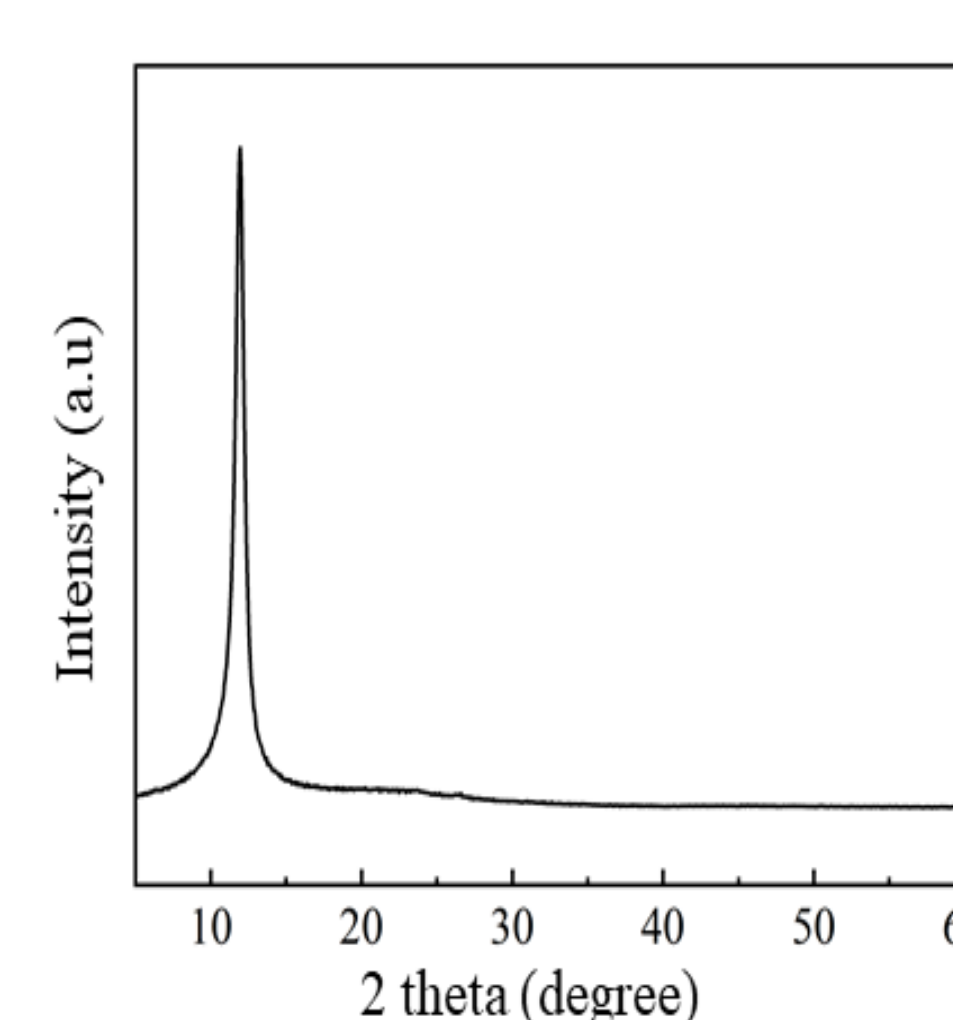


Figure 05. XRD pattern of GO and rGO

Uv – vis analysis

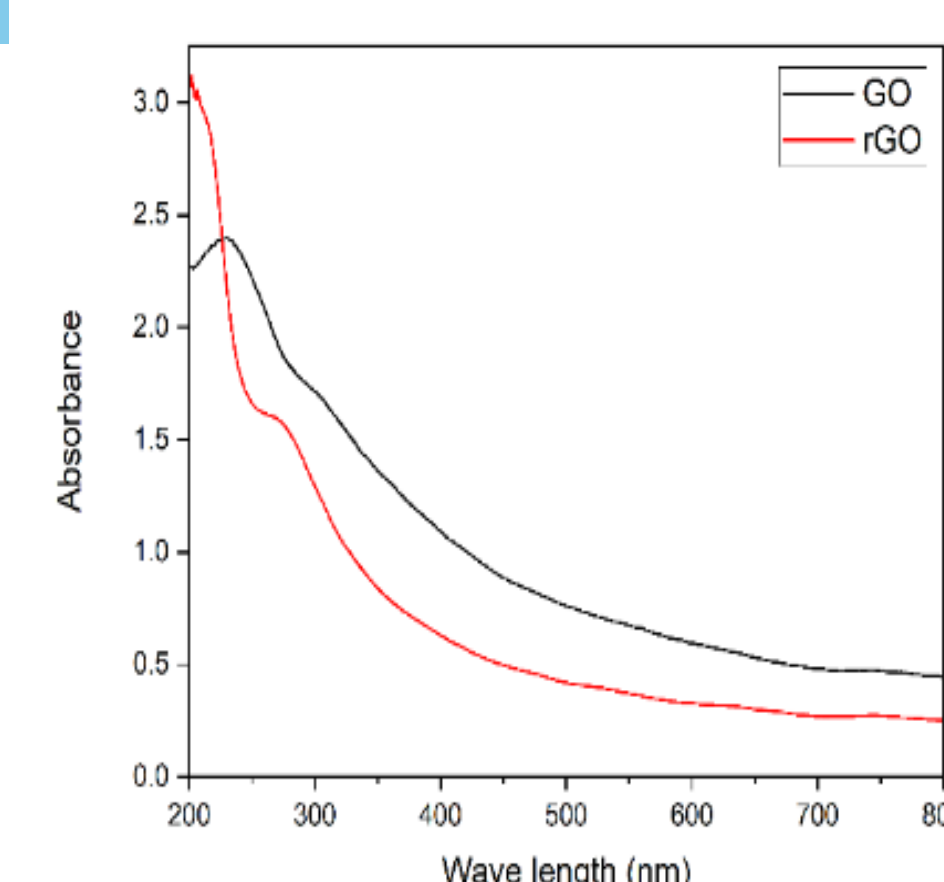


Figure 06. GO exhibited a peak approximately 230 nm and the absorption peak shifted to around 270 nm in rGO

Conclusion

This study successfully demonstrated that *Euphorbia hirta* plant extract can effectively reduce graphene oxide (GO) to produce reduced graphene oxide (rGO). The reduction process was confirmed through a series of characterization techniques, including X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), UV–visible spectroscopy, and scanning electron microscopy (SEM). These results validate the potential of *Euphorbia hirta* as a green, sustainable reducing agent for the eco-friendly synthesis of rGO

Future work

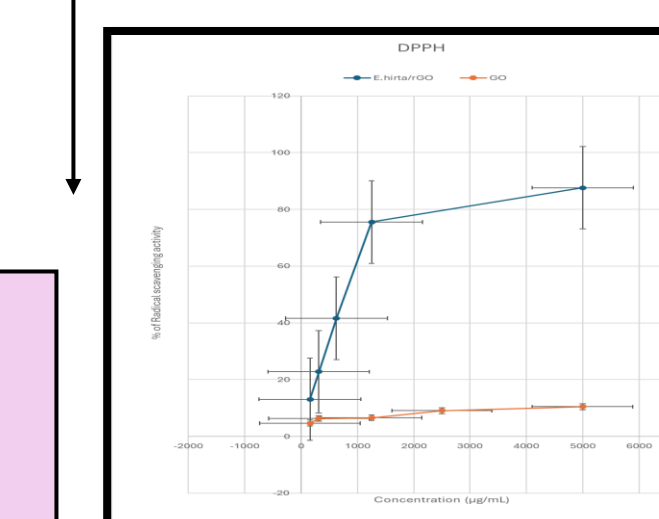
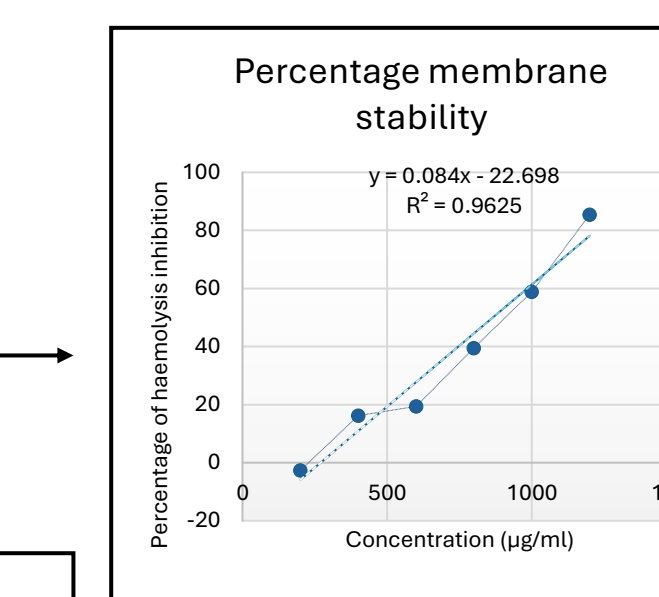
Future studies will focus on evaluating the antioxidant, anti-inflammatory, and wound healing properties to assess the extract's potential for biomedical applications.

Anti inflammatory – Membrane stabilization assay

Investigation of bio medical properties

Potential applications in biomedical industry

Anti oxidant activity – DPPH radical scavenging assay



Why reduced graphene oxide ?

Due to its excellent electrical conductivity, large surface area, chemical stability, and mechanical strength. These properties make it highly promising for applications in energy storage, sensors, catalysis, and flexible electronics.

Results and Discussion

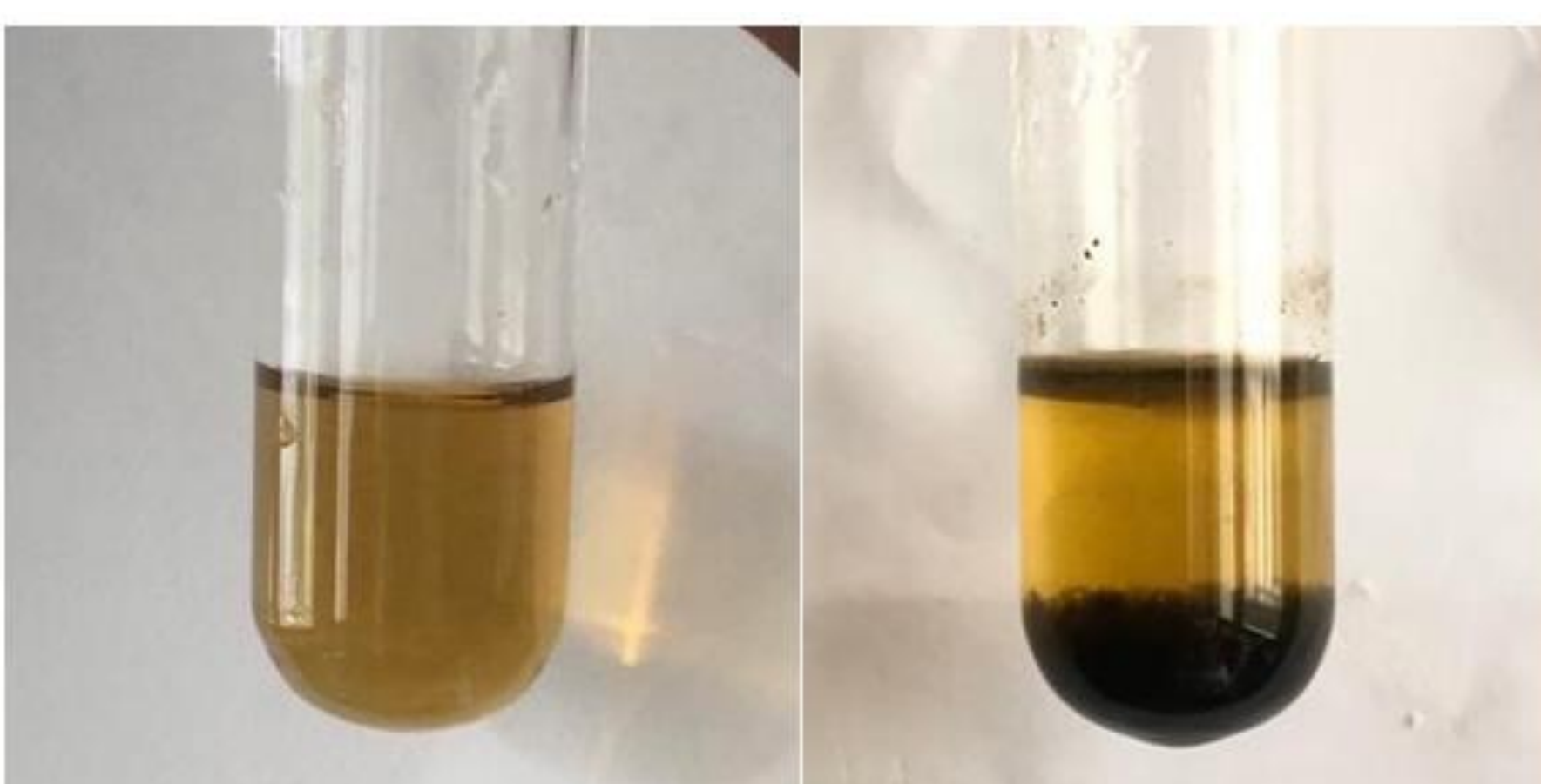


Figure 02. Color change from brown to black due to GO reduction by plant extract. A) Plant extract + GO b) After the reduction Plant extract + rGO.

References

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