Graphene as a nano-delivery vehicle in agriculture – current knowledge and future prospects

Contents of Supporting Information

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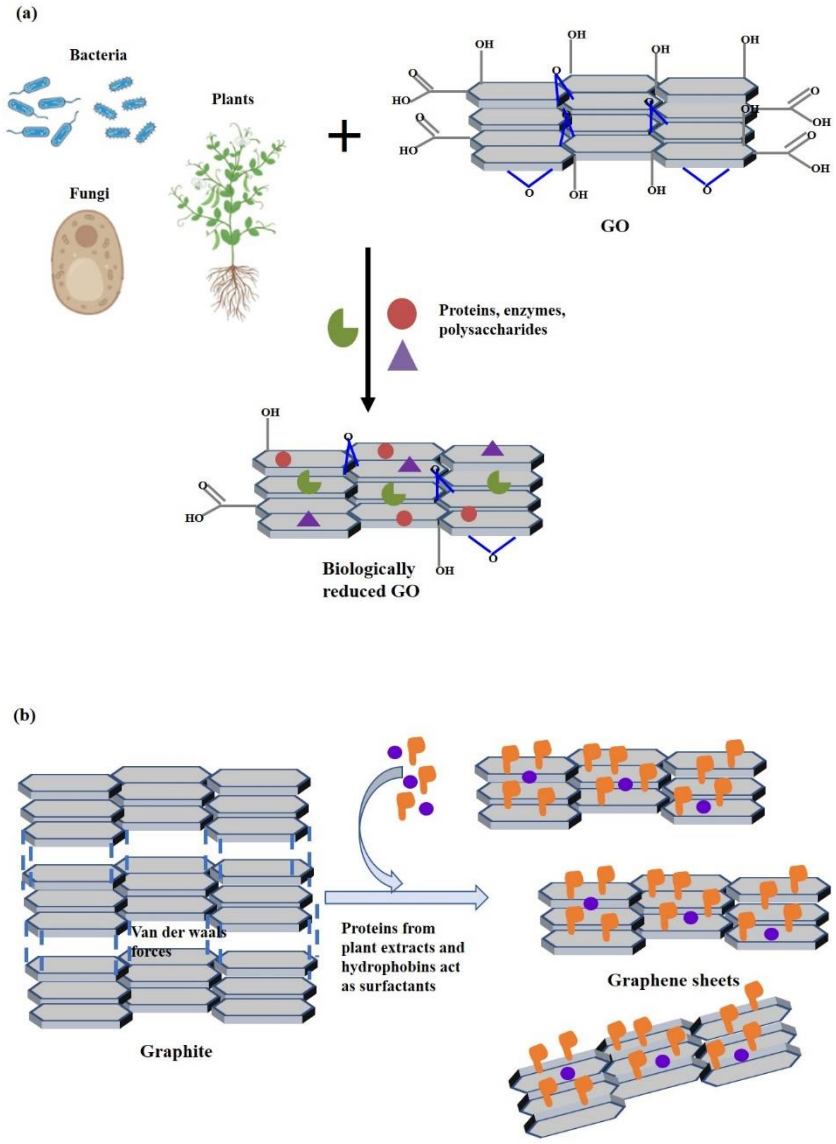

Supplementary Figure 1. Schematic showing (a) biological reduction of graphene oxide (GO) with microorganisms and plant extracts to form reduced graphene oxide (rGO) that is functionalized with biomolecules from the reducing organisms and (b) exfoliation of graphite with proteins acting as surfactants to generate separated graphene sheets.

Supplementary Table 1: Functionalization of graphene based nanomaterials for application on plants

Nanomaterial	Functional group or biomolecule added	Plant	Effects on plant	Reference
GO	Amine group NH_2	Wheat	Increased root length, shoot length, decreased cell electrolyte leakage	[1]
Graphene	Sulfonic group SO_3H	Maize	Increased plant height, increased shoot weight	[2]
GO	Glycine betaine $C_5H_{11}NO_2$	Sweet basil	Higher agronomic traits, photosynthetic pigments, antioxidant enzymes under normal and salinity stress conditions	[3]
GO	Methionine Lysine	Pearl millet	Increased plant growth, plant biomass, photosynthetic content, protein content and yield Improved growth under salt stress conditions	[4]
GO	Proline	Moldavian balm	Increase in morphological parameters, photosynthetic pigments, chlorophyll fluorescence parameters, chlorophyll index (SPAD), and membrane stability index under salinity stress	[5]
Graphene	Amine group NH_2	*Brassica napus L.*	Normal plant growth with no toxicity	[6]

References

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