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Degradation of reduced graphene oxide in gastrointestinal fluids during *in vitro* digestion

Graphene nanomaterials (GFNs), including reduced graphene oxide (rGO), have distinctive characteristics that justifies the increased interest for them in the last years. They are being increasingly used in different fields, so it is important to evaluate its potential risk on human health.

According to the recommendation of the European Food Safety Authority (EFSA) and its guidance on risk assessment of nanomaterials to be applied in the food and feed chain: human and animal health¹, it is required to assess nanomaterial toxicity if exposure is evidenced. Thus, to check the stability of rGO (Graphitene, Ltd) on the gastrointestinal system we aimed to determine its *in vitro* digestion. This was carried using the method described by Diez-Quijada et al., 2020². Different synthetic juices that simulate the human digestive compartments (mouth, stomach, intestine, and colon), were used with 3 different rGO concentrations (200, 100, 50 µg/mL). rGO morphology was analyzed by scanning electron microscope (SEM). The surface charge and aggregation state were measured by ζ potential.

SEM images and ζ potential values showed the agglomeration of rGO samples as they pass through the different phases.

Thus, changes observed on the material can have an influence on its toxicity, aspect that should be further evaluated.

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References

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² Diez-Quijada Jiménez, L., Guzmán-Guillén, R., Cascajosa Lira, A., Jos, Á., Cameán, A.M., 2020. *In vitro* assessment of cyanotoxins bioaccessibility in raw and cooked mussels. Food Chem. Toxicol. 140, 111391 <https://doi.org/10.1016/j.fct.2020.111391>.