

## Preliminary results of gold nanoparticles toxicity in *Blattella germanica*

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### Abstract

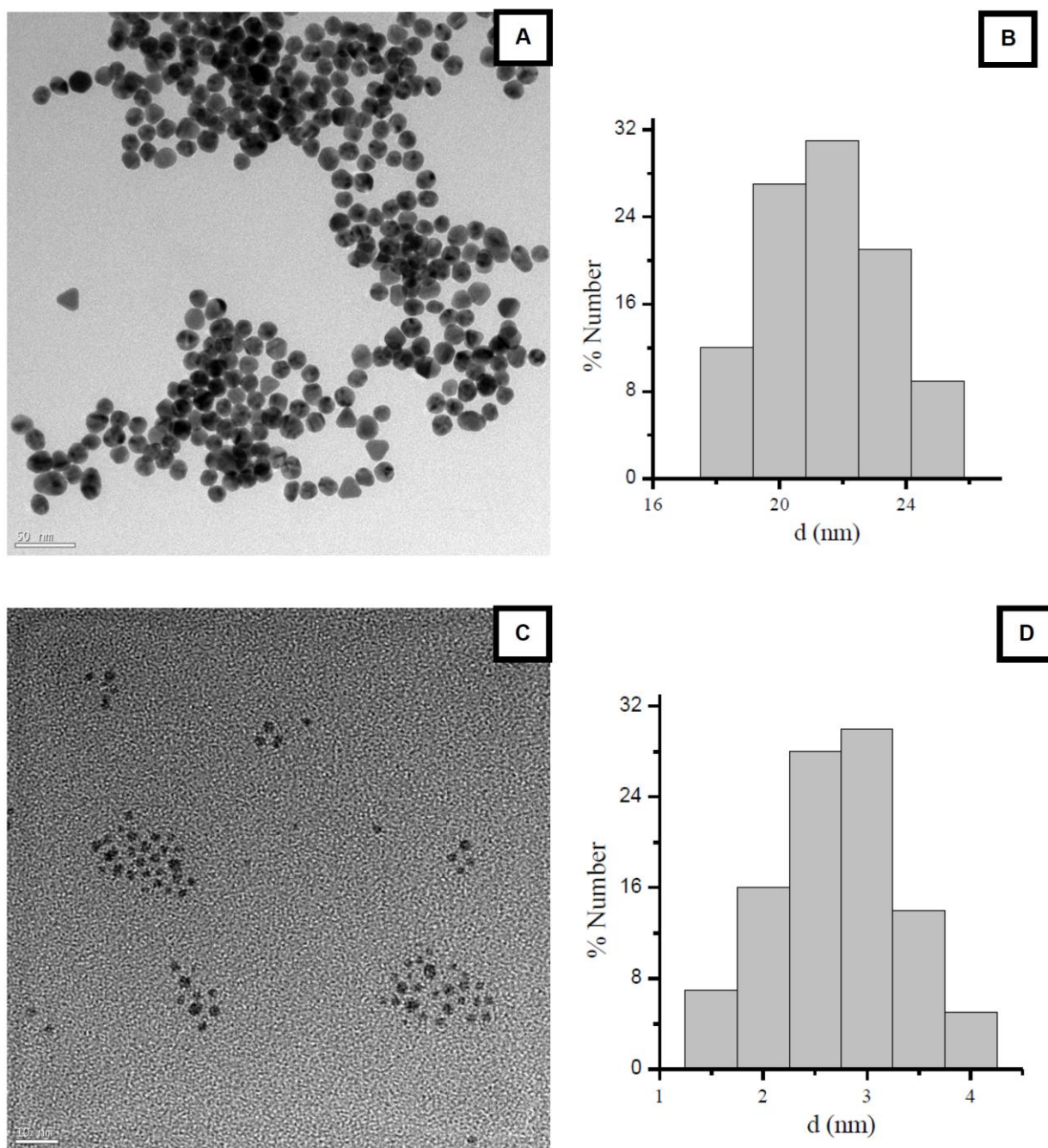
Nanotechnology development has led to manufacturing nanomaterials with more uniform and consistent properties. Understanding the in vivo toxicity profile of these nanomaterials is essential for the determination of their potential applications like controlled-release carriers in biological systems. The toxicity of two types of gold nanoparticles (AuNPs) (citrate-capped and thiol-capped AuNPs) was preliminarily assessed in the German cockroach, *Blattella germanica*. The synthesis of the citrate-capped AuNPs (average size of 21,8 nm) was based in the previous article of Bastús *et al* [1], while thiol-capped AuNPs (average size of 2,85 nm) were synthesized based on the work of Brust *et al* [2]. Both types of nanoparticles were characterized by UV-Vis and Transition Electron Microscopy (TEM) (figure 1). Three different bioassays were carried out for the study of the AuNPs toxicity: injection of nanoparticles solution, spray exposure by a Potter spray tower and the tarsal contact test [3]. Each bioassay was replicated three times for each concentration analyzed using 5 to 10 adults of a laboratory-reared population, aged 1 day; mortality rates were scored 24 h, 48 h and 72 h post-treatment. Finally, inductively coupled plasma optical emission spectroscopy (ICP-OES) was performed for gold intake determination in treated insects. The results indicate that both citrate-capped and thiol-capped AuNPs show no dose-dependent toxicity (KL, LD) response as neither of them seems to cause significant mortality in any of the bioassays used.

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### References

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- [2] M. Brust, M. Walker, D. Bethell, D.J. Schiffrin, R. Whyman, J. Chem. Soc., Chem. Commun. (1994) 801–802.
- [3] WHO, Technical Report Series, Annex 12, **443** (1970) 130-133.

## Figures



**Fig. 1.** TEM characterization and frequency of size distribution of citrate-capped (A, scale bar 20 nm; B) and thiol-capped (C, scale bar 10 nm; D) AuNPs.