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Gold Nanoparticles-Induced Modifications in Cell Wall Mechanical Properties in Egeria Densa leaves

The use of nanoparticles (NP), on purpose or not, in agriculture or in different industrial sectors is a factor of their dissemination in the environment. Therefore, plants come into direct contact with NP and to date, knowledge about their impact on the mechanical properties of plant cell walls is still insufficient.

In this work, we observed cell wall mechanical properties changes of Egeria Densa leaves cells when functionalized gold NP are present or not in the aqueous environment. Force spectroscopy measurements were performed on the different cell types present on mature leaf epidermis. We observe a decrease of the cell wall stiffness of epithelial and tooth cells, dependent on nanoparticle concentration and time exposure, but no significant changes on the cell wall stiffness of idioblasts. The elimination of the NP present by the exchange of the surrounding water leads to a re-increase in the cell wall stiffness after a certain duration.

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