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Review article

Nano-technology applications in fruit trees orchards

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Abstract

Global challenges from increasing population with decline food productivity and scarcity of water and soil resources, reaching to global climatic changes all these factors encourage several researchers to focus on innovation solutions and new generation of technology such as Nanotechnology. Nano-technology considered type of science that deal with so tiny size of material ranged from 1 to 100 nanometer. With this nano-scale size material gained novel properties comparing with original form for the same material these phenomena attributed for hug specific surface area for nano-particles. In regarding to utilize Nano-technology in agriculture sector, it plays important roles in different sides as a real revolution in current era. For instances, nano-technology was used in producing fertilizers which called nanofertilizers, producing nano-pesticides, coating, water treating, increasing water usage efficiency and packaging fruit such as nano-chitosan as antimicrobial film for food packaging due to its fundamental antimicrobial and edible properties. Besides, nano-technology facilitates gene transfer and insertion genes into targeted plant cell with using Mesoporous silica nanoparticles (MSNs) and silica nanoparticles. Also, nan-technology has contribution in cloning fruit seedlings particularly to eliminate contamination in tissue cultures and to enhance in vitro explant development through improving uptake nutrients from culture medium. At the final, it can be concluded that, nano-particles looks like a weapon that has double edges, whereas can be useful and harmful in the same time depending on the way of its' uses. Through this review, authors tried to increase awareness with the importance and summarized contribution of nanotechnology in agriculture sector to increase usage efficiency of available resources, minimizing environmental pollution through decreasing amount of used agrochemicals, from other side, exploring risks of utilizing of nano-materials in agriculture activities and highlight on precautions that should be taken during dealing with nano-materials.