



Nanoscience and Nanotechnology for Food and Agroforestry

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Nanomaterials are the materials between 1 and few hundred nanometers in the size. Due to the outstanding surface to volume ratio and quantum confinement effects et al, nanomaterials have different properties in chemical, optical, electrical, magnetic, thermal, mechanical, acoustic and other properties comparing with bulk materials (Fig. 1).^[1] There are lots of literatures about nanoscience and nanotechnology in the application in the areas, such as display devices,^[2-4] photovoltaic devices,^[5,6] energy storage devices,^[7,8] light emitting^[9-11] and other many other areas.^[12-14] The applications of nanoscience and nanotechnology in food and agroforestry have been reported, however, it is not as common as in the other areas. As a journal focusing on food and agroforestry, we previously reported a few articles about nano for food and agroforestry.^[15] As research carrying on, the application of nanoscience and nanotechnology in these areas will be more and more popular.

The papers in this issue reported the applications of nanoscience and nanotechnology in the areas of pest management, coronavirus detection, pesticide detection and other related areas (Fig. 2). Sonali K. Kale et al. talked about recent advances of silver nanoparticles for the application in nanofertilizers, pest management, food packaging and plant growth. Amit Nautiyal et al. reviewed human coronavirus identification, which involved lots of nano-structures such as gold nanoparticles and graphene nanosheets. Pradnya Chandane and Umesh Jadhav reported their recent research work on Fe₃O₄ magnetic nanoparticles for the detection of malathion, which is an organophosphate insecticide commonly used to control mosquitoes and a variety of insects. No pesticide exposure is risk free including malathion. Umesh U. Jadhav et al. summarized the current status and challenges of the application of carbon nanoparticles for the fresh-cut fruits and vegetables. Fresh-cut fruits and vegetable products are susceptible to microbiological contamination.

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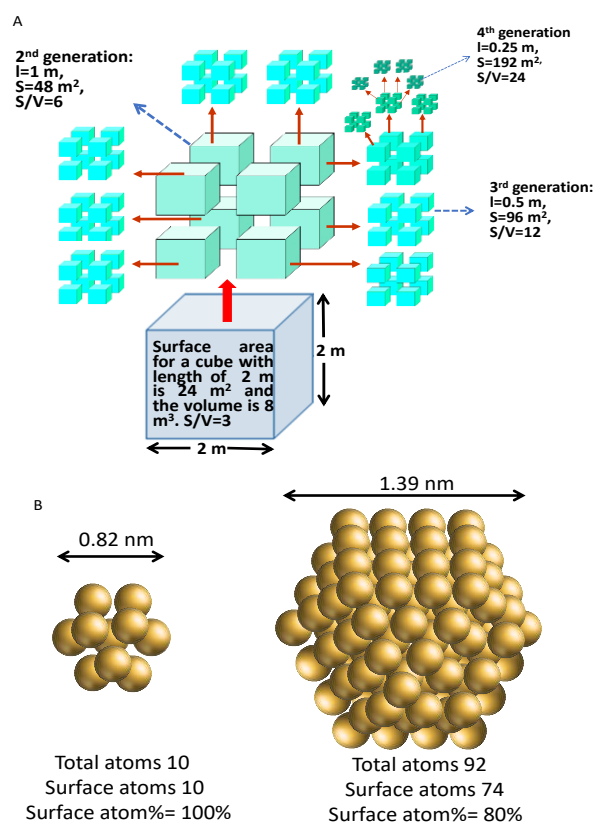


Fig. 1 A. Change of surface area as size decreasing; B. exposure of surface atom.

Finally, Mar Villamiel's personal account talked about pectin, an acidic heteropolysaccharide contained in the primary and middle lamella and cell walls of terrestrial plants, such as citrus fruits. It is widely used in food as a gelling agent, food fillings, medicine, dietary fiber and lots of other applications.

Nano technology as a new frontier of innovation at nano-scale made many high learning institutions reexamine their program curricula offering. The Chemistry and Physics Department in the University of Arkansas, Pine Bluff offers the first B.S. degree in nanoscience. And part of the program will be in collaboration with the Department of Agriculture to focus on the application of nanoscience and nanotechnology in the related topics.

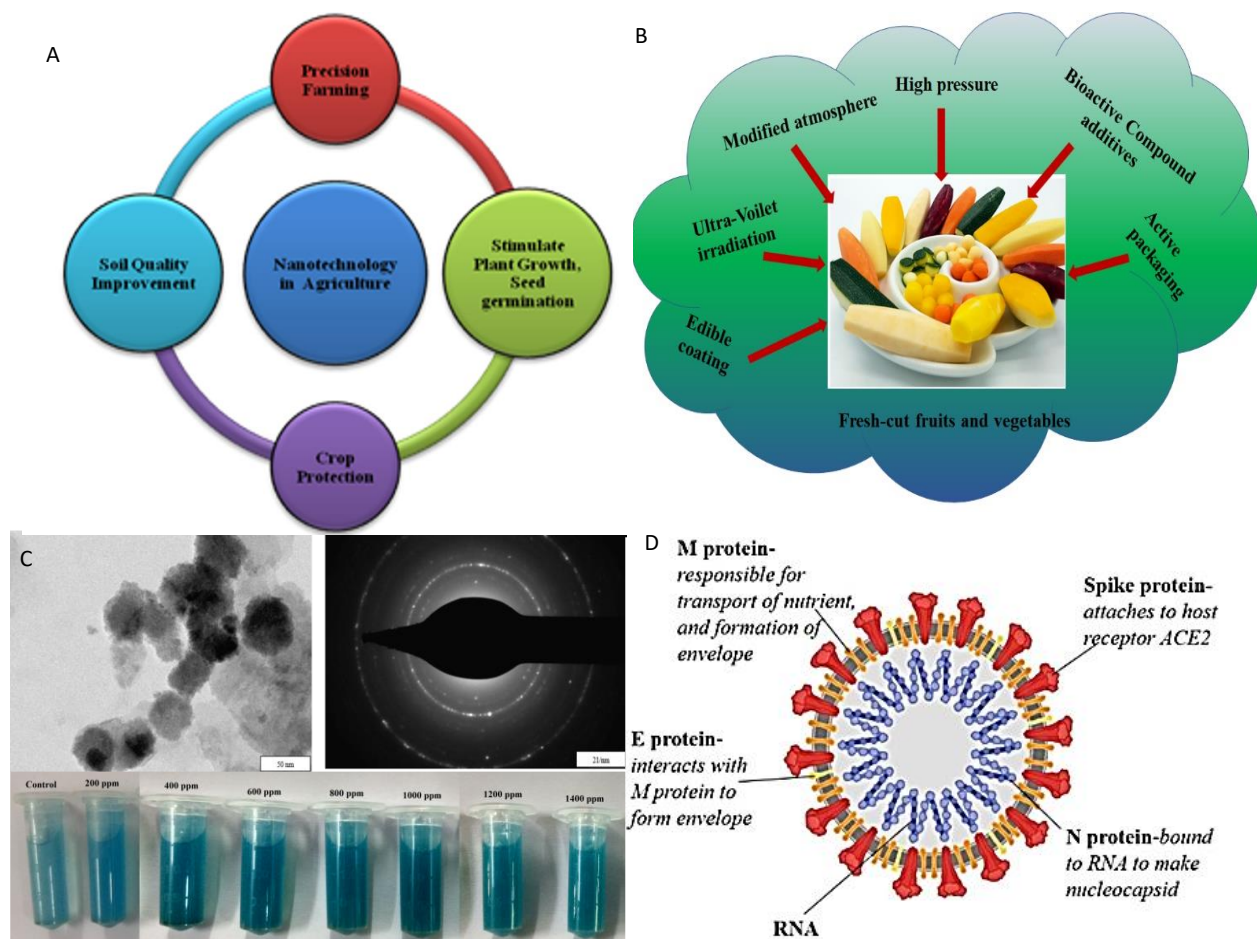


Fig. 2 A. Emerging Agriculture Applications of Silver Nanoparticles, by Sonali K. Kale (DOI: 10.30919/esfaf438); B. Decontamination of Fresh-Cut Produce Using Photo-Active Carbon Nanoparticles: Current Status and Challenges, by Umesh U. Jadhav (DOI: 10.30919/esfaf424); C. A Simple Colorimetric Detection of Malathion Using Peroxidase Like Activity of Fe₃O₄ Magnetic Nanoparticles, by Pradnya Chandane (DOI: 10.30919/esfaf439); D. Identification of Human Coronavirus: An Overview on Conventional, Newly Developed and Alternative Methods, by Amit Nautiyal (DOI:10.30919/esfaf437).

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