

(54) Title of the invention : A SYSTEM FOR NANOTECHNOLOGY-ENABLED PRECISION FARMING AND ENVIRONMENTAL REMEDIATION IN HIGH-ALTITUDE AGRO-ECO-SYSTEMS

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(57) Abstract :

The invention relates to nanotechnology applications in precision farming and environmental remediation in high-altitude agro-eco-systems. It comprises a nanoparticle synthesis and functionalization unit for producing 1–100 nm nanoparticles via methods such as sol–gel processing, chemical vapor deposition, and pyrolysis, coupled with a functionalization module to apply polymer or biopolymer coatings; a nano-delivery system for encapsulating and releasing agrochemicals responsive to moisture, pH, and temperature; a nanobiosensor array interfaced with a wireless network and data processing unit for real-time agronomic monitoring; a nanoparticle-mediated genetic enhancement module; a nano remediation module for degrading pollutants; and a nano-seed treatment unit for coating seeds with a nanomembrane.

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