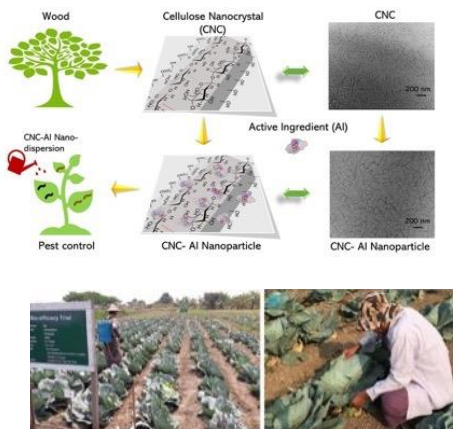


Sustainable delivery system for agro/aquachemicals



Background

Traditional agrochemical formulations use large amounts of organic solvents and surfactants to improve the water solubility of active ingredients (AI). This traditional mode of pesticide and herbicide formulation uses organic solvents that are not environmentally-friendly and thus poses significant health risk to agricultural ecosystems. Thus, there is a need for aqueous agrochemical nano-dispersions using agriculture biomass or forest resources to innovate a sustainable agriculture ecosystem.

Description of the invention

The current technology describes the composition and process to prepare aqueous nano-dispersion hydrophobic agrochemicals or agriculture active ingredients (AI) using sustainable nanomaterials as carriers or dispersing agents. To prepare the nano-dispersion, water-insoluble agrochemical is dissolved in an organic or polar solvent, followed by mixing with cellulose nanocrystal (CNC) dispersion. CNC-AI wettable nanoparticle powder or concentrated dispersion is produced after the organic solvent is removed. The CNC-AI powder (or concentrated dispersion) can then be readily dispersed in water and applied for pest control. The present invention provides a superior pest and parasite control efficiency as measured by the mortality of the target organisms.

Advantages

Most of the pesticides and herbicides are currently being delivered in emulsions, where the hydrophobic pesticides or herbicides are solubilized in organic solvents (e.g., xylene) and thereafter dispersed in water. The use of organic solvents poses severe health threat to the environment and human health. Recent competitive technology entrants into this market space still rely in-part on utilizing organic chemicals (e.g., combination of emulsion and polymer particles) to deliver hydrophobic pesticides or herbicides. The University of Waterloo technology thus represents a novel, environmentally sustainable, and effective means to disperse hydrophobic active ingredients for water soluble applications.

Potential applications

- Delivery of pesticides to control pests in farming
- Delivery of herbicides in farming
- Control and extermination of insects and parasites in animals, such as cattle, sheep, and goats.
- Control of seal lice in fish farming, such as salmon
- Treatment of parasites in ornamental fish industry

Reference

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