SE46 C03

POSTHARVEST DISEASE MANAGEMENT OF FRESH PRODUCE WITH INNOVATIVE AND ECO-FRIENDLY SOLUTIONS

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Managing postharvest diseases in fruits and vegetables is crucial for global food security amid a growing population. Traditional methods like chemical fungicides are supplemented and substituted by innovative strategies utilizing natural compounds, such as essential oils and antifungal edible coatings, and biocontrol agents to curb losses. Biocontrol agents, with mechanisms like competition, biofilm formation, mycoparasitism, and resistance induction are extensively researched for various pathogens and crops. Endophytic microorganisms, found within plants, are emerging as a sustainable option for postharvest pathogen management. Fruit surfaces harbour resilient microbial communities, making it challenging for biocontrol agent the establishment. Integrating microbial communities to create a conducive environment for biocontrol agents shows promise in real-world conditions. Future strategies may involve timing biocontrol agent application already at flowering. Essential oils, valued for their safety, eco-friendliness, and antimicrobial properties, are gaining attention. Their phytochemicals disrupt pathogen metabolism, but challenges like low stability and water solubility require careful formulation. Essential oils can be applied as biofumigants in storage chambers or through coating and encapsulation techniques, enhancing antimicrobial and antioxidant activities. Combining biocontrol agents with nutrient additives, coatings, or essential oils is being explored for improved postharvest pathogen control, aiming for synergistic effects in disease management, in an integrated vision of disease management.

SE46 001

EUCALYPTUS GLOBULUS ESSENTIAL OIL-BASED CONTROL-RELEASE NANOFORMULATIONS AGAINST SITOPHILUS ORYZAE (L.): PROMISING NOVEL NANO-DELIVERY SYSTEMS FOR SUSTAINABLE GRAIN PROTECTION

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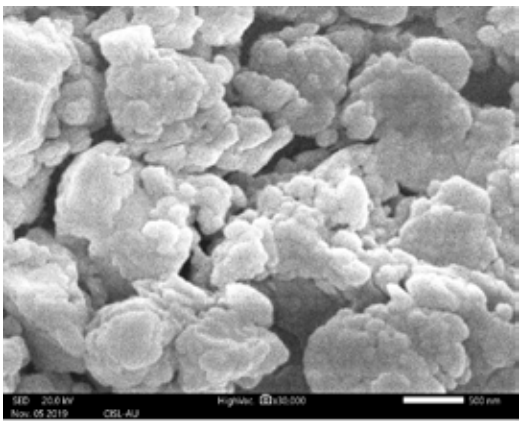
Among the post-harvest losses insects play a significant role. India's annual food grain storage loss due to insects is estimated to be INR 13 billion (IGMRI, 2022; TNAU, 2022). Stored pest management relies on using synthetic fumigants, causing toxic and environmental issues. Phyto-insecticides although promoted as alternatives need to be developed as commercial formulations with long residual efficacy. Control release formulations using natural polymers like chitosan and sodium alginate, improve stability and effectiveness. The *Eucalyptus globulus* (Labill) essential oil (EGEO) possessed anti-insect activities against Rice weevil, *Sitophilus oryzae* (L.). As EGEO is volatile, its efficacy can be enhanced by developing control-release formulations. There are limited number of studies on novel formulations and their efficiency in practical situations. In the present study the EGEO was formulated as nano-emulsion and nanocapsules by using natural polymers and their combinations. The developed formulations were bio-assayed under laboratory conditions against S. oryzae. The morphology, chemical structure and presence of active ingredients in the effective formulation were periodically characterized by FTIR, SEM, EDS and GC-MS. ai Entrapment Efficiency and release kinetics, storage stability and impact on germination were also studied. Chitosan-Sodium alginate nanocapsules (CSNC) recording maximum mortality in the lab was bio-assayed under field conditions. CSNC were effective even after 147 days while pure essential oil treatment was effective till 17 days. Chitosan and sodium alginate possess attractive applications because of their control release, non-toxic, and biodegradable nature. They offer ample scope in the development of novel stored product pest control formulations.



Chitosan-Sodium alginate nanocapsules (CSNC)

SE46 002

ATTRACTIVENESS OF MALE AND FEMALE ADULTS OF CRYPTOLESTES FERRUGINEUS (COLEOPTERA: LAEMOPHLOEIDAE) IN GRAIN

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Whether stored-grain insects can communicate with each other inside stored-grain bulks is an important question for the development of pest management programs. Movements of the individual adults of *Cryptolestes ferrugineus* towards caged adult(s) were studied inside a tube (2.5 cm diameter and 10 cm length), using an infrared camera. The numbers of the caged adults were 1, 20, or 50 of females or males, and 100 or 200 mixed sex adults. Before insects were introduced, the cage was filled with 3 g of feed (whole wheat, wheat germ, and cracked wheat with a 16:1:1 ratio by weight), and the tube was filled with 14% moisture content of wheat. Unlike the trials conducted without grain in the tube for the single caged insects, when grain was present in the tube there appeared to be no major attraction. For the cases of 20 and 50 caged males and females with a single adult of the opposite sex introduced in the tube, there appeared to be more attraction of the single female to caged males. When single male and female adults were introduced to trials with 100 mixed sexed