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Singapore develop world's first microneedle-drug delivery system for plants

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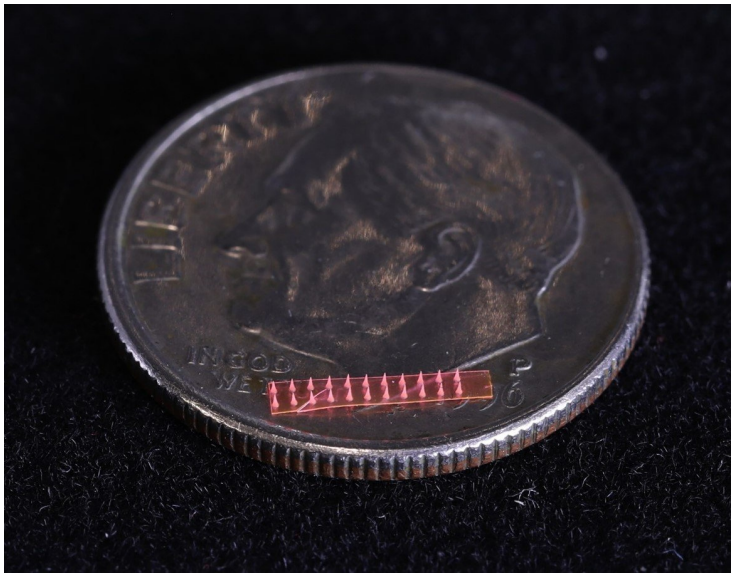

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Singapore researches have developed the first-ever polymericÂ Silk microneedles by designing a system deliverÂ agrochemicalsÂ to a wide variety of plants as an efficient drug delivery system which can be implemented in plant science research and precision agriculture.

Researchers from theÂ Disruptive & Sustainable Technologies for Agricultural PrecisionÂ (DiSTAP) Interdisciplinary Research Group (IRG) ofÂ Singapore-MIT Alliance for Research and TechnologyÂ (SMART), MITâ??s research enterprise in Singapore, and their collaborators from Temasek Life Sciences Laboratory (TLL) and Massachusetts Institute of Technology (MIT), have developed microneedle-based drug delivery technique for plants which can precisely deliver controlled amounts of agrochemicals to specific plant tissues for research purposes. When applied in the field, it could be used in precision agriculture to improve crop quality and disease management.Â

Increasing environmental conditions caused by climate change, an ever-growing human population, scarcity of arable land, and limited resources are pressuring the agriculture industry to adopt more sustainable and precise practices that foster more efficient use of resources (e.g. water, fertilisers, and pesticides) and mitigation of environmental impacts. Developing delivery systems that efficiently deploy agrochemicals such as micronutrients, pesticides, and antibiotics in crops will help ensure high

productivity and high produce quality while minimising the waste of resources is crucial.

However, current and standard practices for agrochemical application in plants, such as foliar spray, are inefficient due to off-target application, quick run-off in the rain, and activesâ?? rapid degradation. These practices also cause significant detrimental environmental side effects, such as water and soil contamination, biodiversity loss and degraded ecosystems; and public health concerns, such as respiratory problems, chemical exposure and food contamination.