Hydrogel Sensors for the Agricultural Applications

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The global supply chain possesses constant potential threats from political disruption, climate change, health emergencies, and trade conflicts. Under the supply chain network, the food sector is the one that is highly affected in difficult circumstances. To minimize disruption of food security it's important to explore innovative indigenous methods as an alternative rather than relying on globally sourced food. In the interest of food security, there has been an innovation and investment wave in the agriculture sector of Qatar over the past decade. There is a demand to redesign, rethink the existing framework, and harness technology to increase productivity in the food sector. The present work is focused on the synthesis of water-absorbing gels along with the design and development of a hydro-gel-based multi-sensory device for improving agricultural production. The synthesized water-absorbing gel will be mixed with soil and gradually releases water into the soil when it is dry. On the other hand, a soil moisture detecting hydrogel will be developed and will be embedded in a multisensory device to provide consistent water monitoring of the plant. The fabricated device will be based wireless NFC "Near Field Communication" sensor. The NFC sensor continuously monitors the moisture of the soil and when it is below the desired range its wirelessly communicates with the installed control water flow unit for plant irrigation. Moreover, the implementation of the proposed idea will increase resilience to the current agriculture system and will also increase productivity.

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