

# IoT-based Traceability Systems for Fresh Fruit and Vegetable Supply Chains - Abstract

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## Summary

In the era of farm digitalization and smart farming, sensing systems, automations, and technologies for agricultural applications have found great acceptance leading towards the farming of the future. Technologies concerning the so-called Internet of Things (IoT) show great potential for applications in the agri-food sector contributing to better decision making, at the field level, and advanced management of the food supply chain securing food safety and limiting food waste.

In this work, the analysis of the requirements for the development of an integrated traceability system is implemented. The system uses advanced IoT technologies in order to constantly and seamlessly follow the processing of the produced fresh fruits and vegetables through the agri-food supply chain. Traceability begins in the field level where IoT sensing systems are used to monitor the growing conditions and production management practices. Specific protocols are followed in order to secure communication between all the components of the system. The communication between the devices of the system is established using LoRaWAN network with communication range that reaches 20 km. In addition, RFID, Beacons, and Bluetooth communication are utilized for specific services. RFID technology is utilized to follow the route from field to the packaging facility and throughout the packaging procedures. The packaged products will carry the product information to the store shelf using RFID and beacon technologies. Finally, RFID technology is utilized for the management of the organic waste produced along the supply chain.

The proposed IoT based system will be the principal step for the development of a holistic traceability system that will resolve or limit important issues in the agr-food supply chain leading to efficient management of agri-logistics, while supporting the operation of circular economy approach. It will serve as a tool that secures food safety and public health while limiting waste through better post-harvest management of fresh agricultural products and by establishing organic waste management procedures.

**Keywords:** IoT; traceability; supply chain.

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