

# Filling the trust gap of food safety in food trade between the EU and China: An interconnected conceptual traceability framework based on blockchain

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## Abstract

Global food trade has become an increasingly crucial element for feeding the world's population. Enhancing bilateral or multilateral trust in food safety in international food trade is not only important for promoting the sustainable development of trade but is also beneficial for cooperation when facing a global food crisis. However, highly credible traceability systems (TSs) for the cross-border movement of food are still absent in many countries and regions. Blockchain is regarded as a promising technology that can help build trust for transparency and security issues. In this paper, an interconnected conceptual traceability framework based on blockchain is proposed in order to increase trust in food safety during food trade. Taking the food trade between China and the European Union as an example, a conceptual framework is designed in order to take full advantage of existing TSs in these two locations, and the features of logistical flow, data flow, and blockchain flow are analyzed. Considering the data capacity and data privacy level, a hybrid data storage method combining on-chain and off-chain is adopted. Smart contracts according to the features of cross-border food trade—including the recording of exportation data, exporter inspection data, shipment data, importer inspection data, importation data, and tracing queries—are packaged and deployed to a blockchain network. An effective operation mechanism involving the distribution of related rights for different roles is presented. The blockchain-based TS framework has the advantages of enhancing bilateral trust in cross-border food trade, providing a flexible and intelligent technical framework, and having effective operability. Future challenges, such as data security, special smart contracts, and consensus mechanisms, and interoperability with other systems, are discussed.

## KEYWORDS

blockchain, cross-border food trade, food supply chain, food traceability, smart contract

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