



# Authentication of Blockchain Technology in Agri-Food Sector

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## DESCRIPTION

The dependence on natural resources has grown dramatically in response to population growth and rising food prices. This has an impact on the food supply chain since it necessitates higher food quality standards and the production of more food in a sustainable basis. One strategy to meet this problem is the Circular Economy (CE), which is becoming more widely recognised. The creation of regenerative natural systems, the reduction of food loss, and increased productivity in the use of resources are all benefits of the shift to circular food supply chains. The literature provides an overview of the key interrelated CE tactics inside several so-called "R" frameworks. The R-preventative framework's tactics for the food supply chain include "Reduce" (food excess or inputs), "Refuse" (preventing food loss), "Reuse" (redistribution for human consumption), and "Re-purpose." Resource efficiency will be attained by technical advancements that lower the quantity of inputs (such as raw materials, land, energy, and water) required to generate a unit of output, as well as through waste recycling and by-product use. Also, better distribution and storage practises aid in reducing post-harvest losses. Regenerative agricultural techniques like conservation agriculture (such as zero-tillage), agroforestry (tree planting on crop farms), local food production, and organic production make sure that the food is produced in a way that replenishes rather than degrades the general health of the nearby ecosystem. However, in order to successfully transition to the CE, a number of challenges must be overcome, including ineffective traceability, a lack of eco-efficiency in technical processes, and insufficient coordination among food chain stakeholders.

The food supply chain is dynamic, thus the agri-food sector must handle numerous players and ambiguous procedures. However, the CE's focus on waste utilisation across the supply chain may create new problems with trust and food safety. For instance, utilising recycled materials for food packaging may cause customers and regulators to worry about food safety. Also, the issue of safety dangers, such as the mycotoxin contamination of feed, the abuse of antibiotics in the treatment of livestock

sickness, and the development of zoonotic diseases, is one of the causes of food waste at the farm level. As a result, food supply chains must make sure that recycling practises adhere to legal restrictions. The use of blockchain technology to address various issues in the food supply chain has gained popularity recently. A blockchain is a distributed, public database used to track a digital asset's origin. As a safe technology, blockchain may be utilised to improve supply chain performance by enhancing transaction transparency, fostering stakeholder integration, and utilising digitalization. By minimising food recalls owing to more effective traceability features and assessing the accuracy of carbon emissions in the supply chain due to its irreversible and transparent nature, supporters of blockchain technology claim that it aids sustainable agriculture.

## Agri-food sector's use of circular economy

Due to resource constraint, the typical linear manufacturing method is unquestionably unsustainable in the food supply chain. Resources are extracted and converted into food items in the linear model, which are then either eaten or thrown away as waste. Food loss is another issue that poses a difficulty to food supply chains because of a variety of circumstances, including subpar agricultural management, processing issues, excess production, and uncertain markets. When farming techniques are not sustainable, the natural resources are harmed, issues occur. The whole food supply chain, from agriculture through industrial processing and distribution to domestic consumption, is accompanied by losses and waste. An estimated 39% of all food produced in Europe is lost during primary production, while 61% is squandered during distribution and consumption.

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**Received:** 02-Feb-2023, Manuscript No. JFPT-23-20090; **Editor assigned:** 06-Feb-2023, PreQC No. JFPT-23- 20090 (PQ); **Reviewed:** 20-Feb-2023, QC No. JFPT-23-20090; **Revised:** 27-Feb-2023, Manuscript No. JFPT-23-20090 (R); **Published:** 06-Mar-2023, DOI: 10.35248/2157-7110.23.14.982

**Citation:** Mieke P (2023) Authentication of Blockchain Technology in Agri-Food Sector. *J Food Process Technol*.14:982

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