



# Blockchain based agri food supply chain

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**Abstract:** Supply chains are evolving into automated and highly complex networks and are becoming an important source of potential benefits in the modern world. At the same time, consumers are now more interested in food product quality. However, it is challenging to track the provenance of data and maintain its traceability throughout the supply chain network. The traditional supply chains are centralized and they depend on a third party for trading. These centralized systems lack transparency, accountability and auditability. In our proposed solution, we have presented a complete solution for blockchain-based Agriculture and Food (Agri-Food) supply chain.

**Keywords:** blockchain, food adulteration, food wastage, customer satisfaction,

## I. INTRODUCTION

The Supply Chain Management (SCM) is a group of processes and sub-processes carried out for transforming raw material into a final product, maximizing customer value and achieving a maintainable competitive advantage. It is also interpreted as a network of entities that are part of the system from production to trading. The whole supply chain network is divided into several stages. Processes involved in these stages often take months to complete. In such situation, if the final product lacks in quality, it becomes extremely difficult to track the root cause of the problem. The demand for top quality products and interest of end consumers in the provenance of data is increasing rapidly. Therefore, it has become necessary for every supply chain system to track the movement of products from origin to the end consumers.

## II. EXISTING SYSTEM

In existing system, the food packages does not contains the proper details like food ingredients, packers details, package date and expiry date etc.. So, the end user or customer does not have any awareness of that product details. That product have product id and shop information only. Real-time monitoring of the food quality and visibility of that quality index would prevent outbreak of food-borne illnesses, economically motivated adulteration, contamination, food wastage due to misconception of the labeled expiry dates, and losses due to spoilage, which have broad impacts on the food security.

## III. PROPOSED SYSTEM

We use the decentralized system blockchain servers to track the manufacturing of packed food items. Here we develop three blockchain servers to monitor the activities between the suppliers, manufacturers and distributors. We propose an architecture to monitor the transparency of the food product. Whenever a product is going to be manufactured the manufacture will be purchasing the ingredients from individual suppliers. Thus the entire flow in a

### Problem definition

- Food adulteration is also a growing concern due to globalization and wide growing supply chain networks.
- Food wastage due to misconception of the labeled expiry dates, and losses due to spoilage, which have broad impacts on the food security.

### Advantages:

- Transparency of a product is shown
- Customer satisfaction is enhanced
- In blockchain each block depends upon previous block so data tampering can be prevented.

### Modules

- Analyze the barcode number based on API
- Manufacture sends product details to Block chain
- Distributer purchasing the product
- QR scan code verification & bank interfacing

**Module Description:****Analyze the barcode number based on API:**

For each product it contains the barcode number and its number will be passing through food API then ingredients will be taken out by using barcode number. First registration. The registration form contains supplier details. Then login. Supplier sells the products to all manufactures what the produce.

**Manufacture sends product details to Block chain :**

The manufacturer initially creates the account. They will analyze the raw materials and the manufacturer will request the quantity of raw materials to the supplier. Then suppliers will accept the request from manufacturer and raw material will be added to the manufacturer inventory. The manufacture will send the product ID, expiry date, number of packets, etc to the block chain and then the created product will be added to manufacturer shipment. From the block chain the manufacturer will retrieve the product.

**Distributer purchasing the product:**

First registration. The registration part contains distributer details. And login. The distributer will be seeing the product in the manufacturer cart and then buying product by the distributer will be added to the block chain.

**QR scan code verification & bank interfacing:**

First Registration. The registration form contains user details. Then consumer login. Consumer buys the product from distributer. The consumer scan the QR scan by using the mobile app and then view the product in the mobile such as manufacturing date, packing date etc. The consumer will check the product and they will buy the product by using online transaction. Finally user transaction ID, product name and cost will be added to the block chain.

**Algorithm:**

SHA (Secure Hash algorithm)-256  
Base64

**Software Requirements**

- Windows 7 and above
- JDK 1.7
- J2EE
- Tomcat 7.0
- MySQL
- Java 8

**Hardware Requirements**

- Hard Disk : 80GB and Above
- RAM : 4GB and Above
- Processor : P IV and Above

**Technology Used**

- J2EE (JSP, Servlets), JavaScript, HTML, CSS, AJAX.
- Hibernate Framework
- MVC Pattern
- Spring Framework

**CONCLUSION:**

Thus the main aim is to avoid the food adulteration and create transparent food supply chain was achieved successfully.

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Architecture Diagram:

