Figure 8–Stakeholders in a processed food supply chain.

Specialized CTE-KDE framework

Although it may appear simple, the supply chain for processed foods is much more complex than described above (shown in Figure 8). Thus, KDEs at CTEs are essential to ensure traceability internally and externally.

Most processed food manufacturers, particularly contract manufacturers, do not have single-formula products. A medium-sized company may have several dozen formulas/recipes that are tailored to different customer needs or preferences; this is especially likely for a processor that produces private-label goods. In addition, it is not uncommon for food manufacturers to use different comanufacturers for different product lines, which adds further to the complexity in a food traceability system.

Ordering of material. For this CTE, quantity, name, or other identifier of the product, and expected receipt date are identified as KDE.

Receipt. For this CTE, the received materials need to be verified against the purchase record/BOL. KDEs are identified as below:

(a) Raw Materials (includes silo materials, processing aids, and all packaging materials)
(b) Method of Receiving, including verification against purchase orders and bills of lading (silo, boxes, pallets, totes, for example)
(c) Event Owner (warehouse, receiving, operations, brokers)
(d) Systems of physical identification (date codes, stamps, labels, inkjet coders, RFID systems, electronic coding systems)
(e) Lot/Batch code identification

(i) Batch code of materials received/supplier lot code system (lot size is critical and varies greatly from supplier to supplier. It is important to understand how the supplier tracks their ingredients (lots) that go into their products)
(ii) Internal lot code system (that is, batch code of intermediate materials assigned internally for production tracking)
(iii) Customer lot code system or batch code of finished goods (assigned to consumer units)

Storage

Storage CTEs should record the following KDEs:

(a) Records: Physical stock reconciliation against stock records
(b) Item Identification, Quantity, Location, and Status (such as transfer status [in transit, still at the vendor, and others] or production status) (unrestricted/available to ship, in test, quality hold, restricted/not available to ship)
(c) Compliance of Inventory Control System:

(i) FIFO or
(ii) FEFO systems or
(iii) LIFO (last in first out)
(iv) or hybrid system

(d) Ingredient Hold System

(i) The process and reconciliation for ingredients
(ii) Supplies put on hold
(iii) Management of test compared with production run ingredients

(1) Status of soft hold, where product can move internally
(2) Status of hard holds, in which nothing should move

(e) Manual compared with electronic WMS.

   (i) Connection of internal identification and supplier codes and lots

Production.

   (i) Event owner (kitchen prep room, ordering of materials against specification and orders)
   (ii) Amount of raw materials routed to production
   (iii) Lot/Batch Code identification

(i) Assignment of new code recorded against the receiving code to ensure traceability

(d) Records systems (to track codes, amounts, usage, time of production, production line of the ingredient usage, and others)

(i) Reconciliation of material used compared with recipe: Verify that correct amount of material was used and code date/lot properly recorded on batch sheets
(ii) Main record system compared with comanufacturers' systems
(iii) Partial ingredients or packaging material record returning to inventory after production

(a) Intermediate materials (work in progress [WIP]), at Premix/Preweigh
(b) Intermediate materials, batch at production
(c) Record to keep partial batches (use of different batch/lots in different production dates)
(d) Rework

   (i) Raw material or component recirculation information, such as the location and the usage
   (ii) Record for Held WIP, how managed and tracked

Packaging.

Packaging material has become a critical raw material over the years. Since packaging materials typically are produced in large lots, it is very essential that the manufacturers keep detailed KDE information at this event.

There are 3 CTEs for which KDEs need to be collected:

(a) Intermediate materials batch, after packaging, into primary unprinted container
(b) Intermediate materials batch, at secondary packaging
(c) Intermediate materials batch, after secondary packaging

The KDEs that need to be collected are:

- Raw Packaging Material Supplier Information
- Lot Code
- Location (manufacturing site and processing line)
- Packaging material, quantity/usage
- Product Code
- Product Name
- Product Batch/Lot Number

It is important that the quantity, lot number, and supplier information be recorded for any unused packaging materials, for their future usage. If the products are repacked into different configurations, and new Universal Product Codes (UPCs) and batch code are assigned, the linking information must be recorded so that the new UPCs can trace back to the original product information.

Shipping.

The finished products are dispatched to internal or offsite storage locations.

(a) Lot/Batch Code identification

   (i) Assign new code with production date, lot code, line ID, time of production, expiration or use-by date, and establishment number, for USDA-regulated products
   (ii) Tracking of pallet codes with code date on product

(b) Reconciliation of all pallet units

   (i) Serial Shipping Container Code

Outside warehouse.

(a) Reconciliation of all pallet units
(b) Multiple deliveries based on orders
(c) Serial Shipping Container Code
(d) Number of Traded Units, per dispatch unit

Customer.

(a) Lot/Batch Code identification

Other KDEs to consideration.

(a) Event Owners

   (a) Record information
   (b) Store records
   (c) Access records

(b) Records

   (a) Date/Time coding
   (b) Lines
   (c) Quantities
   (d) Usage
   (e) Records development
   (f) Records control
   (g) Records types
   (h) Records corrections
   (i) Recorded storage and access
   (j) Records discrepancies (ordered compared with amount received, display shipper complexities) and management of damaged, out of date, destroyed, or returned product; the source to obtain warehouse damage and unsaleable information

(c) Raw Materials

   (a) Raw materials generic names
   (b) Vendor/Supplier name
   (c) Vendor/Supplier batch/lot code system
   (d) Quantities ordered, received, stored, used, returned, damaged, or lost
   (e) Delivery date
   (f) Supplier internal ID numbers
   (g) Certificate of Analysis (COA) data

   (a) Intermediate Materials, additional information

   (a) Start time of mixing, usage
   (b) Quantity mixed
   (c) End of time of mixing
   (d) Lost, damaged
   (e) Returned, unused materials to warehouse