FOOD PROCESSING
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EXECUTIVE SUMMARY

Anything But Cookie-Cutter: Eight Formula Management Needs of Food Manufacturers

Randy Smith, CEO & Founder, Vicinity Software

MUST-HAVE KEY FEATURES

- Multi-level lot traceability.
- Lot expiration/expiry date.
- Quality tracking and quarantine.
- Allergen tracking disclosure.
- Defined substitutions.
- Mixed unit of measure on batches.
- Scheduling by formula and mixes.
- Nutritional analysis in R&D.

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Anything But Cookie-Cutter: Eight Formula Management Needs of Food Manufacturers

OVERVIEW

Because most manufacturing software is built for discrete manufacturing, it is not the best fit for process and batch manufacturers, even with customizations and add-on tools. Software developed specifically with food manufacturing in mind streamlines operations, reduces costs, drives supply chain efficiencies, adapts to regulatory requirements, increases customer satisfaction, and more.

Focusing on **eight must-have software features** can help food manufacturers make the right choice of batch processing software.

Vicinity has been a scalable technology partner since 2001, serving formula-based manufacturers in the chemical, food, and brewing markets. Vicinity Software is a robust, feature-rich product at an affordable price that grows as you grow.

- Manage limitless recipes
- Control inventory
- Improve quality assurance
- Increase profits
- Eliminate redundancies
- Decrease costs

CONTEXT

Randy Smith shared eight features that food manufacturers can most benefit from having in their batch processing software.

KEY TAKEAWAYS

Among the key technology changes in the food manufacturing industry in recent years is the shift from locally hosted data to **cloud-based platforms**. The move to remote work due to the COVID-19 pandemic drove improvements to security and configurability of the cloud environment, which in turn increased adoption of cloud-based applications, including for batch processing.

However, the expansion of options available to manufacturers can make it challenging to decide on a best-fit solution. For food manufacturers looking to control inventory, improve quality insurance, increase profits, and more, there are **eight key "must have" features** for any batch processing software solution. These are:

1. **Multi-level lot traceability.** There are two primary reasons for lot traceability: 1) to use in a mock audit or live recall; and 2) for lot trace. While food manufacturers already conduct lot tracing, most are focused on doing so to ensure compliance—since food manufacturers are subject to regulatory requirements to demonstrate a reasonable recall process within a short timeframe. Computer-assisted recall, using an inventory system with a centralized database, facilitates a much more efficient recall than manual processes.

   However, electronic lot tracing also plays a key role in improving operational efficiency. Lot tracing allows food manufacturers to follow raw materials to an intermediate and eventually into a finished good that is delivered to a customer. The concept of lot tracing also becomes the framework for measuring the impact of change, such as how quality variations affect finished goods or customer satisfaction, or scheduling and machine efficiencies.

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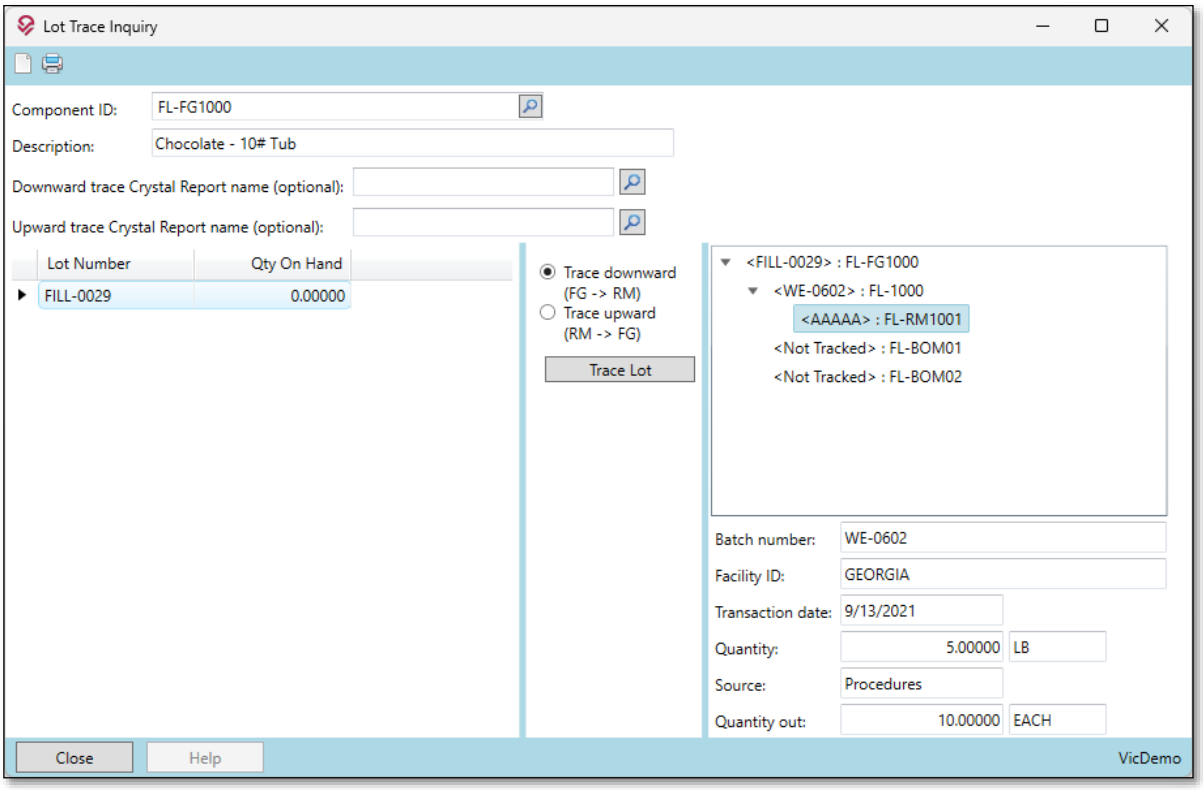
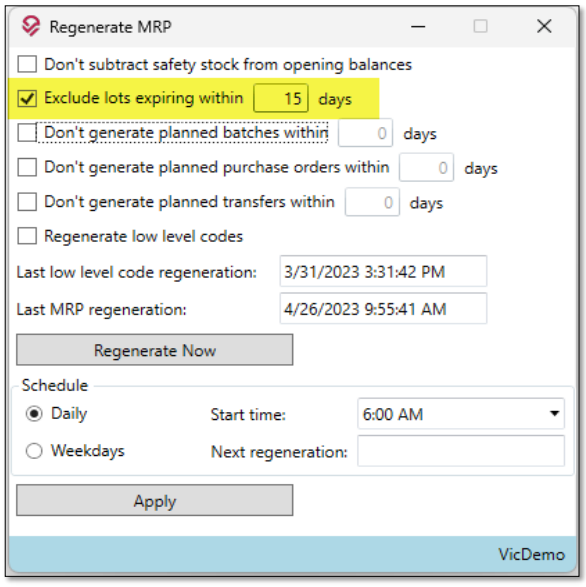
Figure 1: Vicinity Software's multi-level lot tracing feature



2. **Lot expiration/expiry date.** Features that manage lots so they are used before expiring help reduce loss, and optimizing ingredient use based on freshness for the more effective finished goods will improve the quality of the product. Assigning the expiration date for each lot at the time of receipt of an inbound ingredient depends on the vendor manufacture date (i.e., when the ingredient was made) rather than date of delivery.

   The Vicinity application supports directed picking based on FEFO (first expire, first out) settings to ensure good lot rotation. The application does not necessarily require a computer on the floor, but solid identification and communication for warehouse management and operations will facilitate the directed picking process.

Figure 2: Using MRP expiration data to optimize lot picking



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3. **Quality tracking and quarantine.** For any manufacturer, quality tracking and quarantine functionality is used to isolate non-conforming raw materials or ingredients that do not meet spec upon receipt. However, an electronic quality tracking feature can also be leveraged to evaluate vendor performance to understand how well and how often a vendor is conforming to the specification.

   Maintaining digital records allows food manufacturers to not only make this assessment, but to do so regularly to ensure that what a vendor promised is delivered, and in the time promised. With a system identifier, food manufacturers can quarantine at the site or lot level, allowing for greater flexibility in space management.

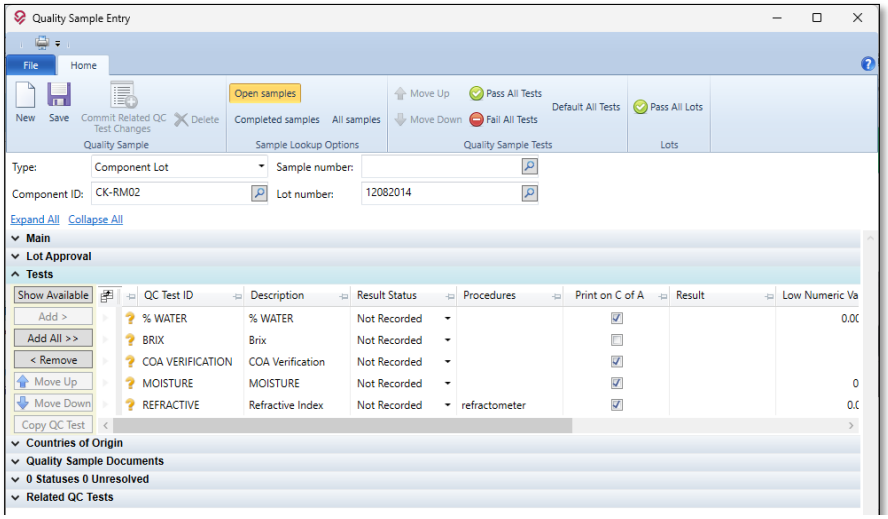
   Vicinity recommends conducting three quality control tests:

   1. *Inbound ingredient test* (in-house or COA) *and release*. These are conducted by lot on raw materials, based on ingredient specifications. Using Vicinity, lots can be gated and not released for production until QC requirements have been certified.
   2. *In-process batch tests* (corrective actions) *and release*. Tests conducted by drawing a sample from a stage while the batch is being processed can lead to a necessary corrective action. With Vicinity, a release process can be applied so that any lot associated with a corrective action is not released until it has cleared QC, with all data and actions recorded to ensure thorough communication with production.
   3. *Packaged finished good tests* (shelf-life stability). In some scenarios, being able to ship a product before it passes QC, or before QC is closed, is helpful when entering QC results against that end item even after it has left the facility.

Vicinity also finds it helpful to conduct multiple panels of tests on multiple samples over time, and to have the test results recorded in a system that allows aggregation for the batch.

> "The ability to document that data [from multiple tests] and put it somewhere without causing a lot of stress and strain on your staff is helpful."
>
> *- Randy Smith, Vicinity Software*

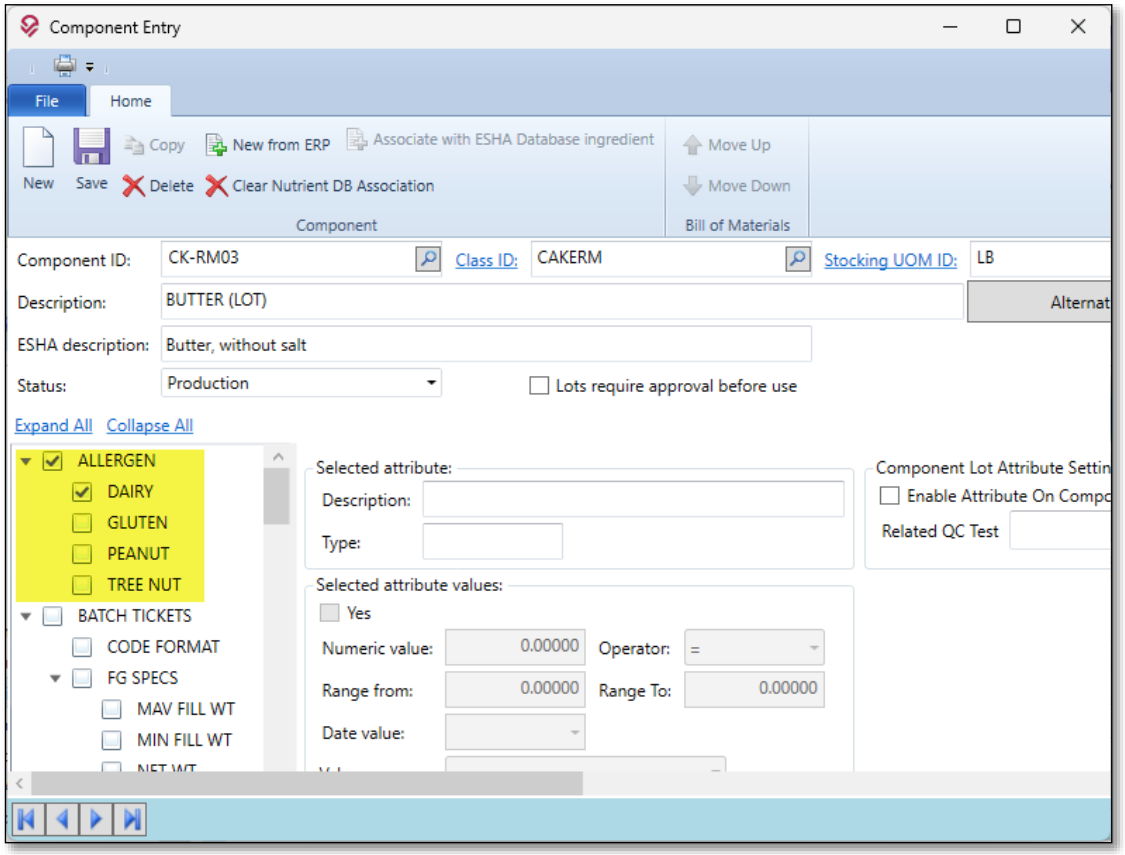
Figure 3: Vicinity quality control across the lifespan of a product



4. *Allergen tracking disclosure.* Allergens in a formula, whether ingested or topical, must be disclosed for compliance reasons. This includes cross-contamination allergens. Having this information in a computerized system assists in allergen tracking as well as in the scheduling process. Being able to manage runs electronically improves operational optimization, as certain allergens can be scheduled to run together, then a cleanup conducted, before different allergens run. Marking each individual ingredient or component in the system with known allergens facilitates communication, such as by automatically printing the allergen disclosure on a batch ticket to notify a team that cleanup will be required or visualizing (e.g., using color coding) the schedule by allergen.

Batch processing software not only optimizes food manufacturing operations around moving ingredients through the process, but a good system can also help manufacturers better accommodate inflation-driven adjustments. In addition to strong communication and a good relationship with suppliers to receive advance notice of price changes, food manufacturers are best positioned to handle price increases if they have tools to project and visualize the impact of those new prices. Planning ahead using proposed costs based on current and/or historical production schedule can help companies make adjustments that can preserve the bottom line, but to do so requires the right system and the right data.

Figure 4: Allergen tracking by component



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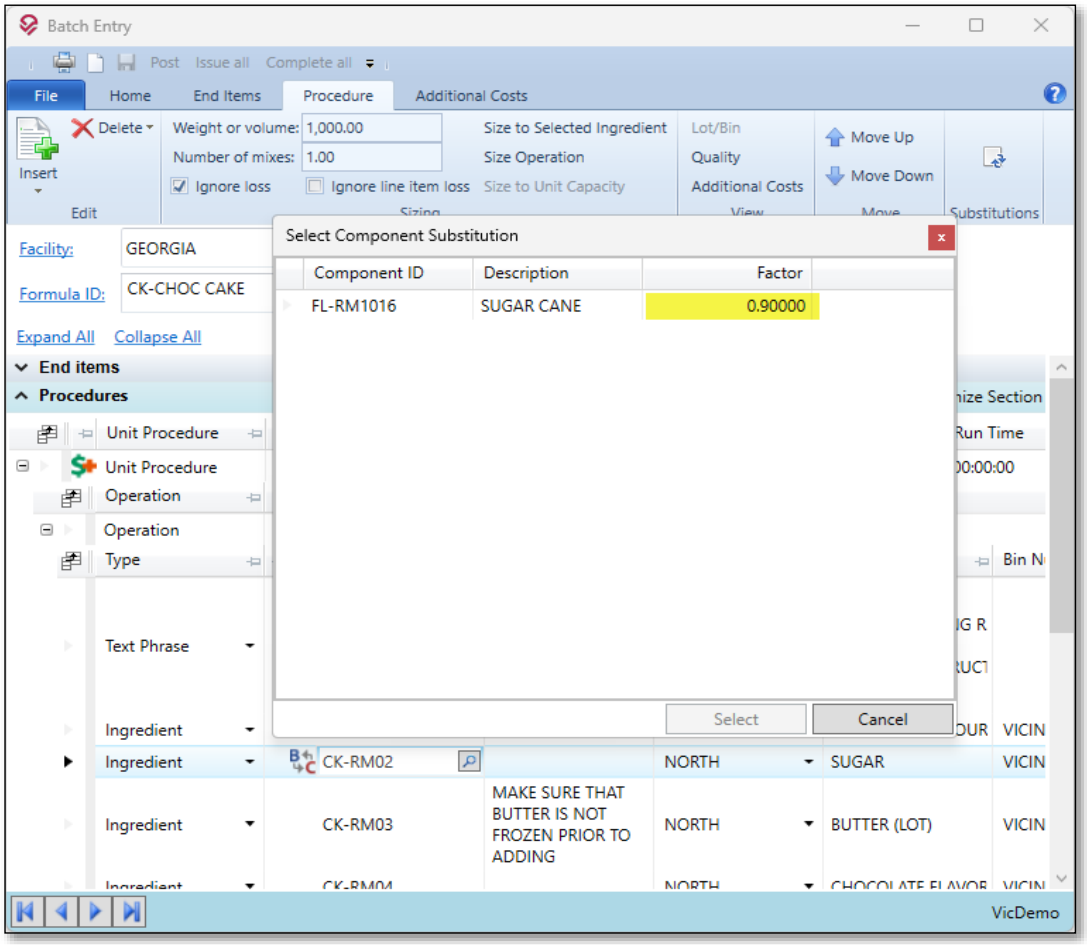
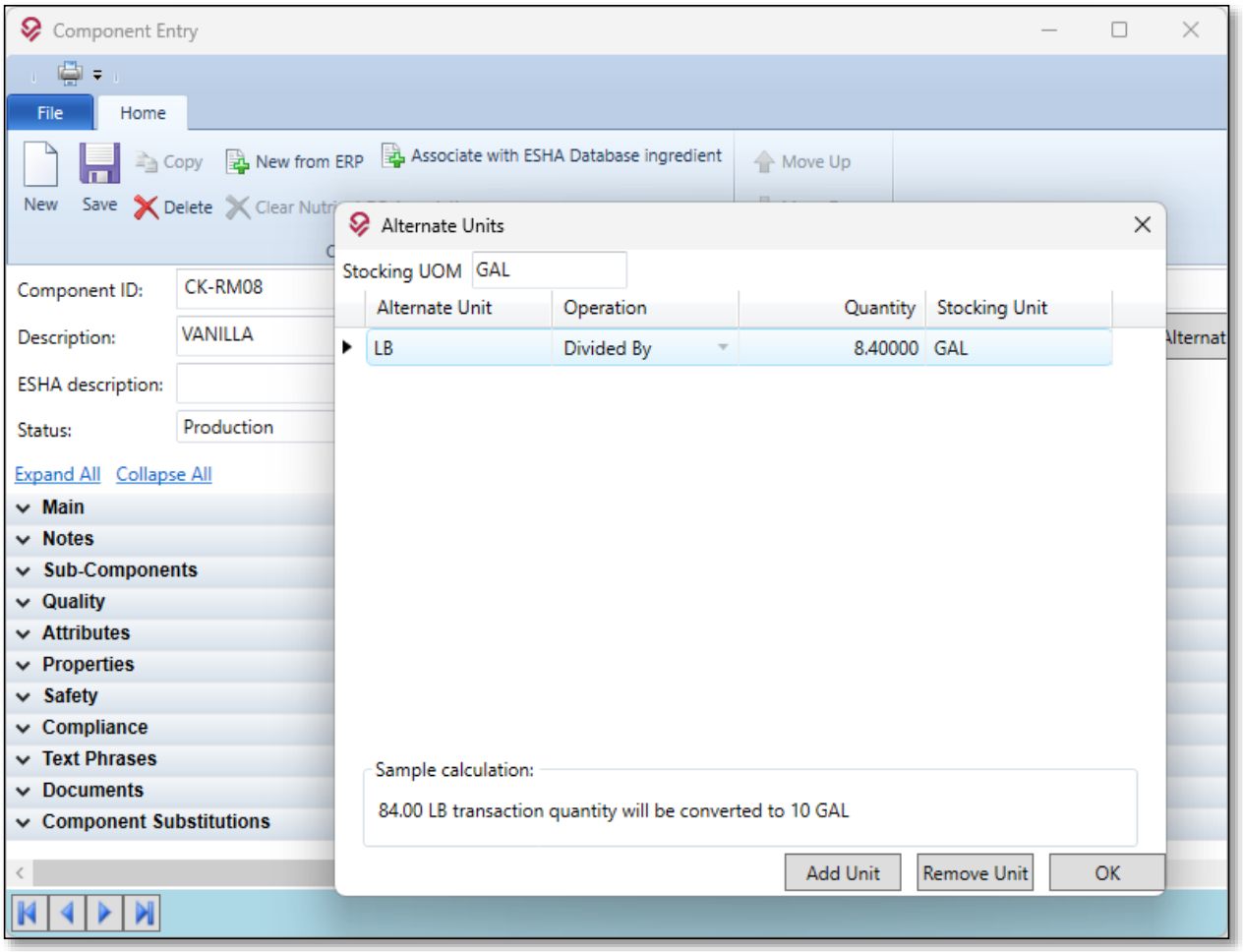
5. **Defined substitutions.** There are times when a substitution may be necessary, whether due to low inventory, lot expiration, or customer requirements. The Vicinity system incorporates granular substitution information for:
   - *Item substitution:* Can this item be substituted for that item?
   - *Formula-specific substitution:* Can this raw material be substituted for that raw material for these formulas?
   - *Strength and sizing factors for substitutions:* User-defined units of measurement make more sense for individual manufacturers. The manufacturers set the units of measurement and the system automatically does the math, making it much easier to add product or size and scale a batch.

Figure 5: Substitution by ingredient



6. Mixed unit of measure on batches.
   Time, temperature, and pressure can affect units of measurement, as can solids in liquid suspension. Being able to mix variable units of measure in batches, with the system handling the mathematical conversion to weight on the back end, and all with decimal precision, makes the work of operators much easier.

Figure 6: Managing mixed units of measure within a single batch



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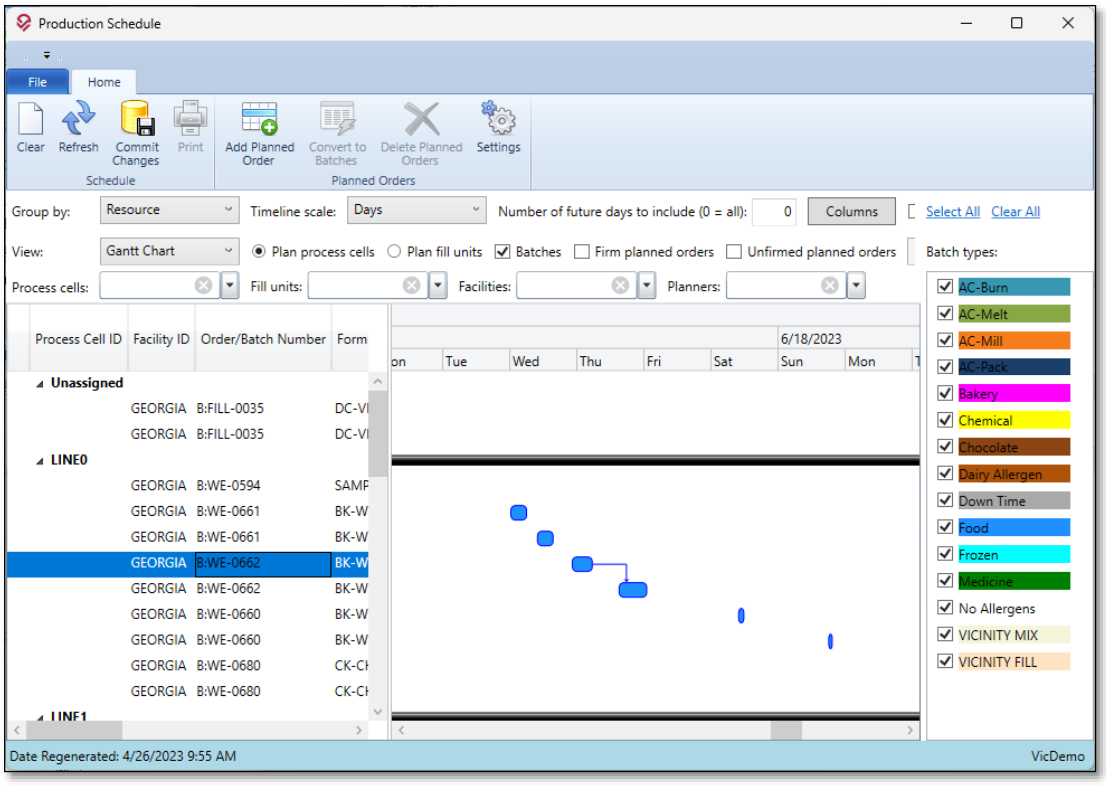
7. **Scheduling by formula and mixes.** Vicinity handles shop floor and production schedules, among others. Food manufacturers want to improve economies of scale, executing larger runs and batches where possible. Vicinity's scheduling by formula functionality allows multiple end items to be made at the same time, as opposed to many other manufacturing software applications that schedule at the SKU level. Applying the compounding formula that ties all ingredients together supports a longer run with fewer changeovers, not only improving scheduling but also reducing cost by lowering downtime, and potentially improving quality.

Scheduling by formula also assists with the creation of intermediates. For end items that share a common formula, making more in a batch and holding it for a short period of time before packaging allows manufacturers to get finished goods out with additional stock for other packaging runs. The flexibility of scheduling at the formula level extends to manufacturers with multiple facilities, balancing work between locations, earmarking formulas for specific environments, and more.

> "While it may sound subtle and not so exotic, scheduling by formula is a big differentiator that we have in the market."
>
> *- Randy Smith, Vicinity Software*

Figure 7: Scheduling by formula



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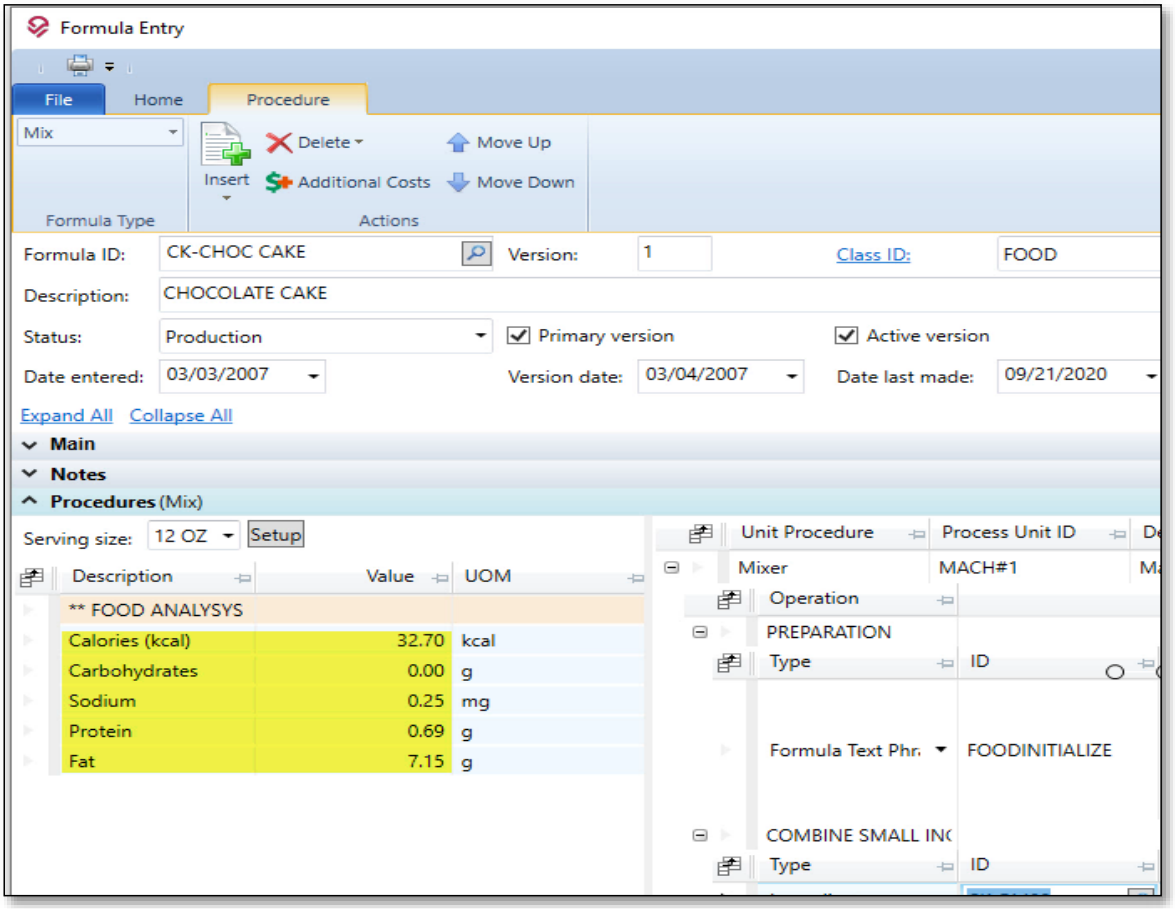
8. **Nutritional analysis in R&D.** Entering ingredients information into an integrated system allows manufacturers to depend on and reference a single source of truth. Allergen information, physical properties, and nutritional properties associated with raw materials are stored in the same place and ensures that everyone is working from the same scenario, both internally and externally, from the R&D department to customer service, sales, and beyond.

Vicinity assigns nutrient properties at the supplier ingredient level, using that information to dynamically calculate the ingredient statement for a particular formula and to incorporate different serving sizes associated with that product. While Vicinity can create a nutrition label, the application also integrates with other label-generation software, as well as other systems, to receive aggregated, granular data without having to rekey or maintain multiple databases.

Figure 8: Nutrition information is dynamically adjusted according to batch size



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ADDITIONAL INFORMATION

To learn more about Vicinity Software, visit vicinityfood.com

BIOGRAPHY

Randy Smith
CEO & Founder, Vicinity Software

Randy Smith, CEO and founder of Vicinity Software, drew upon his family background in manufacturing and years as an auditor and systems consultant to create a software focused on small to mid-sized manufacturers in the batch processing industries. In 2001, Randy co-founded Vicinity Manufacturing (rebranded to Vicinity Software in 2018), known as a provider of industry-leading batch processing ERP solutions for manufacturers in the food, chemical, and brewing industries and the first software product for formula-based manufacturing in the Microsoft Dynamics reseller space.