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Nine Tips for Achieving Balance in Recipe Management

Food companies and others are trying to standardize software and systems across plants, and even countries, while at the same time permitting flexibility in recipe management. Here are some recommendations to make it easier to achieve the right balance:

1. **Phased development**. Implement a batch structure that makes use of small phases: the smaller the phase, the greater the flexibility. Another capability that supports the development environment is implementing a batch execution system that enables you to first create the recipe while you are running it and then save-as to bring the control recipe into a new master recipe. Start a control recipe with only a few building blocks and add phases and/or operations from a library while you are creating the product. If you have done this recipe creation from almost scratch or if you have improved an existing recipe by changing structure and/or adjusting parameters, you can easily save-as into a new/modified master recipe.

2. **Split screens.** Recipe screens should follow in the same order as the operation and troubleshooting manuals. Use split screens so the operator can see the specific screen on one window and the sequential state of the specific step in the overall process in another window. The larger the screens and the more uniform the fonts/colors, the easier the information will be to access and operators will make fewer mistakes.

3. **Maintain recipe control**. Centralized control of recipes is essential. These should not be kept at the plant level, but must be "checked out" from a centralized (controlled) database. Limiting the number of people who can change the recipe, or at least throttling down the parameters available, can help limit mistakes from incorrect recipe changes. Also critical is protecting the intellectual property of these tangible assets. Have a safe practice to transfer the recipe from the nutrition department to the plant. It could be wireless. Make sure it has a buffer to keep the new recipe until the old one is done.

4. **Simplify changeovers.** Follow ISA S88 standards for quick and automated changeovers. Procedures are clearly defined and can be monitored. If a specific process cell is troublesome, it can be isolated, analyzed and corrected. The correction could range from rewording the procedure to improving the instrumentation or automating the process—all without requiring a facility rebuild. Mis-categorizing CM, EM, phase and other values can make for long, cumbersome recipes or inflexible ones. The clues are in ISA-88 and ISA-106TR.

Two principles for recipe development

Take into account two basic principles when developing a recipe:

1. **Recipe cost.** Estimate the final cost of the new recipe, including extra costs arising from industrial trial, designs and OEE.
2. **Scalability.** Don´t forget to check the recipe's viability from the point of view of industrial scale, including all matters like cleaning due to allergens, flowability, pieces per minute, etc.

5. **Simulate programs**. Control process recipes are usually developed by technologists who understand the processes but who often don't understand the problems of programmers. Formalize recipe descriptions to avoid ambiguity in their interpretation by the programmers. It is very useful to simulate recipe-based processes to demonstrate the work of the program that implements the specified recipe. After the first such demonstration for recipe authors, it is highly probable that the recipe records will need to be changed.

6. **Keep ingredients separate.** Avoid contamination in any changes that are made by keeping the ingredients separate. Form/fill/seal machines have to be cleaned thoroughly when changing from one mix to another. Once changed, be sure to run a batch for checking the components of the mix. Any software changes have to take into account all the items contained in the original software.

7. **Database concerns.** Recipe management software should be based on the dynamic of current standards for each country. Common classifications for these countries should be located in the same database. How the database, names, classification, etc., are developed is critical. In terms of classification, there should be a different database for food components functions and their relative importance for the recipe. It is also important to provide a database for manufacturers, distributors and issues related to final potential users, such as diabetic or allergenic concerns.

8. **Open and expandable.** Stick to open platforms as much as possible, while seeking vendors that will provide the service and support associated with a traditional propriety product. Make sure the system is upgradeable or expandable. Always perform an electrical power survey first when considering upgrades.

9. **Servo solutions**. Servo control makes it easier to change line speed than with cam control, which often causes problems. Servo control also allows for quick and repeatable product changes. Connecting the servo drives to a field bus also minimizes wiring.

Seven Best Practices for Recipe Management

Flexible and modular recipe management improves the efficiency of batch processing systems. Best practice tips include:

1. Create a modular and flexible batch process integration physical model.

2. Link very tightly the various components of procedural model of batch process system software with components in the process control system.

3. Have a flexible route management method for material transfer to avoid equipment down times.

4. Create a material tracking and genealogy system to support recipe management.

5. Follow ISA S88 batch standard physical and procedural models to develop a batch plant model.

6. The recipe model should be designed so that all shared equipment is open and that run time status information coming from the process controller can be acquired to define the production process flow.

7. Ensure that the batch process software selected is also able to access runtime status data from the process control system and not just at the end of batch.