

# WHITE PAPERS

## INNOVATIVE PROCESSING SOLUTIONS



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In this white paper, we address innovative solutions for solving processing challenges. As food processors increase product offerings to meet consumer demands, we provide tips for managing multiple SKUs and look at best practices in preventing cross-contamination when introducing gluten-free products. We also offer insight on how automation can increase throughput and share a case study on one plant's solution to eliminate noxious odors.

## PROCESS SOLUTIONS FOR ADDING GLUTEN-FREE TO YOUR PRODUCT MIX ADDING GLUTEN-FREE PRODUCTS: TIPS FOR PREVENTING CROSS-CONTAMINATION

Ingredient changes and process design solutions are much easier to engineer in a new plant than in an existing one. Plants that work with allergen products can design dedicated process lines, separate storage areas and well-planned cleaning processes to avoid any cross-contamination issues. Yet with gluten-free products being relatively new on the scene, retrofitting an existing plant to incorporate this allergen into the current product mix can be challenging. Here are steps to take within key areas to eliminate the potential for cross-contamination:

### PROCESSING

**1. Dedicated process lines** — Process engineers can often evaluate and provide recommendations to reconfigure existing production areas to include a dedicated allergen line. Ideally, each line should also have its own HVAC and/or refrigeration system to effectively control airflow between areas. A full separation of lines will allow other lines to remain in production without any contamination risk. Engineers can also provide recommendations to include dedicated ingredient delivery systems for allergens.

**2. Segregated workstations** — Dry-mixing and dry-blending areas should be housed separately. Airflow should be carefully controlled between the two areas to ensure that particles do not spread. Elevated platforms for equipment that processes allergen products can also be used to reduce the risk of cross-contamination.

**3. Production schedules** — Non-allergenic products should be scheduled first followed by allergen products. A scheduling matrix can help minimize clean-in-place (CIP) and changeover time between batches.

### STORAGE

**1. Segregated storage areas** — Room modifications may be made to create separate storage areas for allergen and nonallergen ingredients. A design engineer can review the facility's layout and determine where walls can be constructed to accomplish this.

**2. Storage control system** — Plants can maximize their space by storing more than one allergen in storage areas. This does require a well-planned, well-documented system with dedicated storage bays and color-coded bins for

each allergen product.

## CLEANING

1. Implement proper cleaning techniques — Equipment that processes both allergens and non-allergens should include an effective CIP system that will sanitize and flush the lines during changeover.

2. Detergents with varying pH levels — Sanitation experts and cleaning product providers can evaluate your plant's needs based on the allergens processed and recommend specific cleaning solutions that will be most effective in removing any residue left on equipment.

## CONTROLS

Hazard Analysis and Critical Control Points Plan (HACCP) — Allergen control should be included as part of the plant's HACCP plan. Assess the plant's allergen and develop a detailed plan for addressing those risks. Conduct internal audits on a monthly basis and review the plan to ensure that all practices are addressing allergen controls.

## MANAGING MULTIPLE SKUS TO MEET CUSTOMER DEMANDS

The food and beverage industry has become all about consumer demand and meeting preferences for tastes, specialty ingredients and preparations (such as non-GMO, Kosher, and gluten-free), flexible packaging, and convenient serving sizes. Take the coffee industry for example: one customer wants a special blend in a light roast with a medium grind. Another customer wants a different blend in a dark roast with a fine grind. You can do the math and see the exponential impact of the options. Every variation creates a unique SKU for the coffee producer.

As a result, food producers often find themselves saddled with too many different products, or SKUs, all in an effort to appease customers. Too many SKUs can drag down profits with frequent changeovers that drive up production costs and decrease throughput. Here are ways to manage multiple SKUs:

## SALES

1. Ensure that your business plan addresses the balance of sales and production. Will your plant produce to inventory or produce to client preference?

2. Detail the process for adding additional SKUs to your product mix. Can a sales representative create a new SKU, or a temporary one, to meet a customer's special request? Does your sales force understand the production process and the impact of adding new SKUs? Walk them through your manufacturing operation and explain how a simple variation, such as a change in roast, affects the entire production process and product cost.

3. How are your sales representatives compensated? Consider factoring each SKU's profit margin, including start-up costs, into your compensation package.

## ANALYZE SKUS OFTEN

1. Conduct an asset optimization study. Assess how your plant's assets are being utilized, or underutilized, based on each SKU. Periodically, review each SKU and analyze them for asset utilization, production cost, market demand, and profit margin.
2. Is there an opportunity to combine two similar SKUs while satisfying customer demands? Can you eliminate a SKU by offering customer incentives to accept a product that you're producing in larger quantities? The cost of the incentives may justify substituting a higher quality product versus shutting down production to accommodate a changeover for a smaller run.
3. Determine your most / least profitable SKUs and set a threshold for eliminating those that may be dragging down profits.

## PRODUCTION SCHEDULING

1. Incorporate production scheduling into your plan and review it frequently. Can you process extra runs of the same product to save time and money?
2. Consider putting freezes on your production schedule for one or two days to avoid any last-minute customer requests that throw the entire process into disarray.

## REDUCE CHANGEOVERS

1. Fewer SKUs mean fewer changeovers. Conduct a manufacturing analysis to determine....
2. Meeting a multitude of packaging needs often leads to frequent changeovers, especially with newer packaging options such as single-serve or tray packs. Consider case size consolidation, on line printing and label application.

Consumer and retailer demand for specialty products will continue to increase. Maintaining your company's strategic integrity and profits, while continuing to meet customers' needs, requires a balance in sales and production.

## ELIMINATING NOXIOUS PLANT ODORS THROUGH INCINERATION: A CASE STUDY

Odor complaints from those who live and work near food processing plants have been making headlines lately, resulting in bad press and poor community relations for the manufacturers. The Environmental Protection Agency's (EPA) Clean Air Act was created to reduce emissions of hazardous and odorous air pollutants and outlines specific requirements for food processors. Subsequently, odor control should be a part of any food processing plant's Good Manufacturing Practices (GMP) program.

In food processing facilities, both the product and the method of cooking can lead to strong, often unpleasant, odors. For example, smokehouses used to cook hotdogs can produce emissions with odor and other pollutants. A client recently approached Stellar seeking assistance in developing a cost-effective and efficient method to burn off undesirable odors as a result of meat processing.

There are several ways to address and control industrial air pollution. For this particular client, Stellar decided to incinerate the odors by directing the waste air to the boiler where it was burned off. The exhaust stack is connected to a duct where a fan pushes the odorous air horizontally about 250 feet into the makeup air plenum of the boiler. The boiler was a custom unit capable of accepting the moist combustion air.

We provided the client a more cost-effective alternative that eliminated the odor and reduced potential long-term maintenance costs.

## **OTHER TECHNIQUES INCLUDE:**

Filtration— Roof-mounted air scrubbers can filter the outbound air before releasing it into the atmosphere. Air scrubbers can be expensive and require maintenance and frequent filter replacements.

Process changes — Modifying the quantity and / or cooking time of products can reduce the concentration of fumes in the air.

Chemical scrubbing— Odor eliminating products can be added to the scrubbers to change the molecular structure and capture the odor causing components.

Each method of managing odors has unique benefits and costs. It is important to work with a food processing mechanical systems expert to determine the best application for your plant.

## **AUTOMATE THESE THREE PROCESSES TO INCREASE THROUGHPUT**

As product lines become more diverse due to increased demand in specialty ingredients in multiple sized packages with private labeling, manual processes become both costly and time consuming. Many food processing plant managers are recognizing the benefits of automating previously manual processes to increase production and reduce labor costs.

Although the upfront costs can be a deterrent, there are three areas where automation can definitely increase throughput while reducing changeovers and labor costs:

**1. Recipe management** — Instead of relying on paper recipe sheets that operators manually carry and reference when specifying weights and ingredients, the recipes are entered into the plant's automation system with full batch sheets sent to the operator at the HMI. The operator can then set the equipment according to the weights and ingredients specified in the recipe. As ingredients are added, load cells (electronic weigh scales) on the cook kettles

weigh the ingredients and compare against the batch sheet to ensure the correct amounts are being added, which also reduces user error.

**2. Packaging** – Customer requests for multiple package types, sizes and labeling can result in significant downtime due to numerous changeovers. Many processes are automating their packaging systems including carton printing and case coding. Printers are programmed to code them all with the appropriate SKU, date, time stamp, and lot number. The system tracks the amount of cases produced and stores them for palletizing.

**3. Palletizing** – Robotic palletizing improves speed and efficiency with the ability to build “truck-high” (100 inches) pallets versus “single-high” (50 inches) pallets, which are standard in manual palletizing operations. Truck-high pallets can be placed directly onto trucks, reducing the need for the warehouse to stack single-high pallets together via forklifts before they are moved onto the truck.

For more information, contact Stellar:

(904) 260-2900

(800) 488-2900

stellar@stellar.net

stellar.net

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2900 Hartley Road

Jacksonville, FL 32257