CASE STUDY

BROWN-FORMAN

Staying Ahead of the Curve of Product Traceability with Formula-Based PLM

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Contents

Introduction

With the rise of global food supply, wide-reaching transparency in food safety, inspection and regulation has touched all aspects of the food and beverage industry. Today, food and beverage companies are not only responsible for providing information about their ingredients from the point of packaging to consumer, but they must also provide fidelity down to the source. Companies are facing a greater volume of complex product questions from all sides of the business: consumers, distributors and global, national and local regulatory agencies all want specific details in order to make informed rules and safe health choices.

As regulations evolve based on market conditions and consumer requests, manufacturers are digging down to the tiniest components of their formulas to trace and update source and maintain compliance—and doing it again and again as regulations evolve and certain ingredients.

We sat down with Jimmy Bookstore, VP Product and Process Development at Brown-Forman, to discuss how these changes have affected internal product formulation, how he sees food and beverage companies changing their internal operations in response and why formula-based PLM software is a necessity for remaining competitive and compliant among constantly shifting traceability standards.

1 The Rise of New Global Traceability Standards

As recent as the late 1990s, consumer questions about ingredient sourcing and formula combinations were few and far between for food scientists. Consumer-facing regulations were limited to the labeling of allergens or natural and artificial identifiers. Regulators and distributors in specific countries were concerned with a few dietary or religious exceptions, but the list of required documentation was short.

Over the last twenty years, however, traceability standards have evolved alongside growing industry regulations and public health research. The Food Safety Modernization Act (FSMA) overhauled food safety and inspection standards in 2011, shifting the focus in the industry from simply responding to food contamination after the fact to preventing it in the first place. As such, food and beverage innovators are facing greater demand from all angles due to a number of parallel changes:

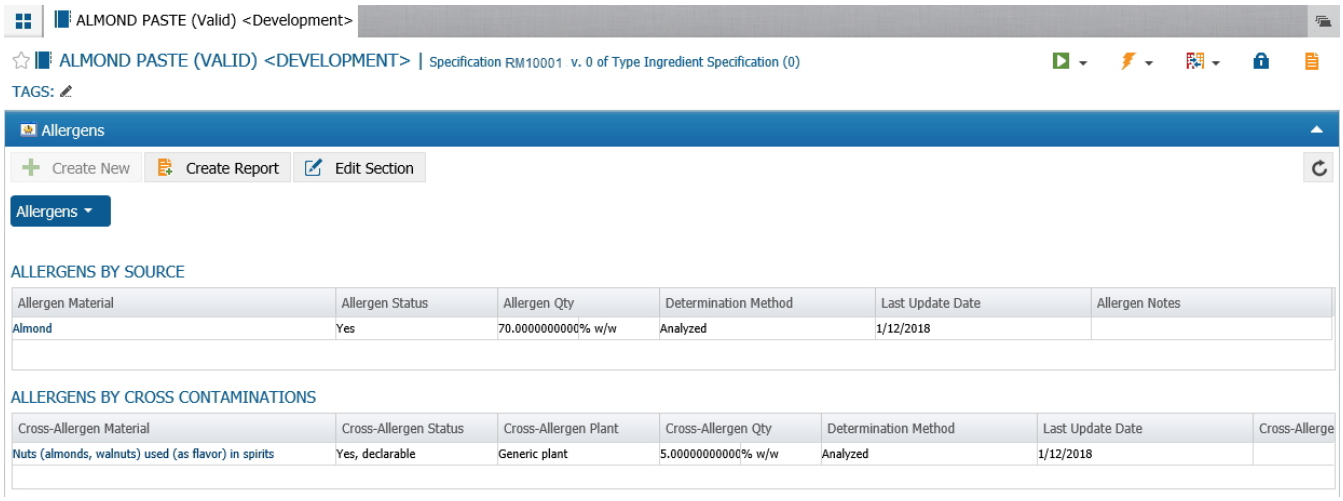
Increase in Consumer Awareness

According to the CDC, 3,000 people die each year from foodborne diseases, most of which are preventable. As such, consumers are more invested in knowing where their food originates, require greater trust from brands they select and have more tools at their disposable for researching food integrity. Distributors' risk aversion has also grown, with the responsibility for recalls, reactions and ingredient properties shifted back to manufacturers. Consumers and distributors want more information up front about ingredient origins—a challenge for manufacturers working with complex and interconnected global sourcing methods.

Growth of Global Regulation

Today, regulations around the same ingredient may differ from country to country. The same product might need to adhere to FDA and TPP rules in the US and JECFA and EFSA standards in Europe, all which are under constant review and changes. If a previously approved additive is delisted for use in a certain country, companies have to dedicate a huge amount of time and resources to finding and updating affected formulas, especially for products with extensive research and development phases and multi-layered formulas.

View of the Almond Paste Allergens within the Devex PLM system



Proliferation of Allergies

Requirements for listing allergen properties, such as peanuts, were not standard in the industry until quite recently. In past decades, many children were not exposed to certain foods early on and developed allergies to common ingredients. As the understanding and causes of allergies have increased, pediatricians suggest exposing children to certain ingredients early to develop immunities to common ingredients. Now, food labeling must account for allergen data and additional ingredients may need to be avoided or changed in product development and formulation.

Increase in Distribution Questions

As a result of regulations evolving to become more varied and complex from country to country, distributors within those countries also require detailed product information in order to receive and renew their import licenses. Food and beverage manufacturers must be prepared to answer questions about ingredients hidden in many layers of their formulas and provide many different variations of products depending on the sourcing and ingredient requirements of each country's distributors.

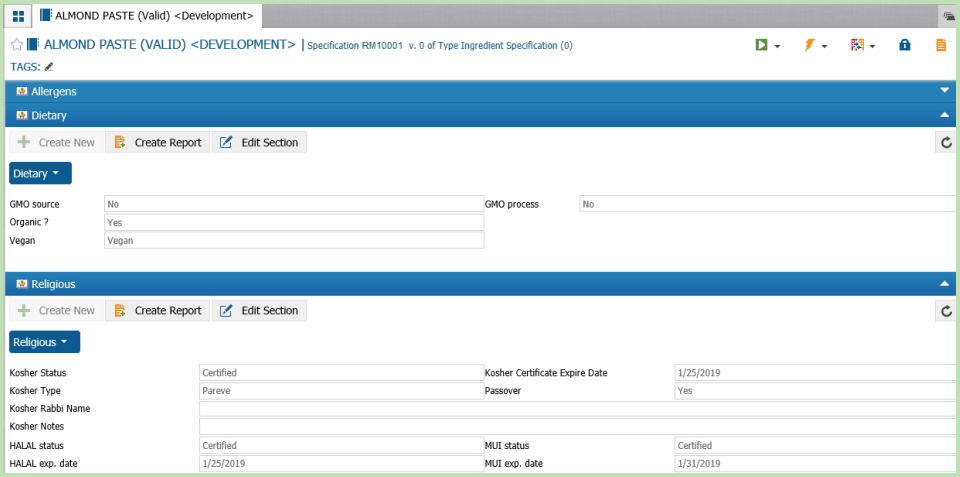
As a result of these changes, today's manufacturers are required to trace and label a whole host of detailed ingredient and product attributes. In response, companies must produce, provide and manage a much larger volume of paperwork to track these attributes.

Today, companies need to have their thumb on a dizzying number of country-specific regulations that determine these standards, invest in resources to influence those rules before they are implemented and also have the right internal procedures in place to change the product formulas quickly in response.

"Overall, people have much greater access to your company through social media and there are many more ways that questions come to you now," says Bookstore. "The need for transparency about your formulation and process has grown and consumers have the ability to research if what you are telling them matches up."

PRODUCT ATTRIBUTES

1997	2017
Natural properties Kosher status +	Kosher status



View of the Almond Paste Dietary and Religious screen within the Devex PLM system

Halal status
Gluten
GMO
Allergens
Vegan
Natural colors
Additives
Preservatives
Calories
SDS
Country specific documents
Ingredient source info
“Does not contain” statements
Technical data sheets
Ingredient declaration breakouts

2 The Risks of Using Paper for Prevention

With the scale and volume of required product information and regulatory standards exploding, companies that use paper-based or disconnected digital files to track ingredient data are at a growing disadvantage for staying in compliant and competitive. Companies without a centralized system are vulnerable to a number of traceability issues and struggle to respond efficiently to changing conditions and update attributes throughout the product lifecycle.

For Bookstore, the breaking point for moving away from paper to a PLM system came when his company wanted to increase the number of products it offered in numerous overseas market.

"We were managing from paper. If we were going to increase our product offerings, there was no way I could manage the detailed questions through Excel and Word, and storing documents in an electronic file box. I get numerous questions every week and had to approach this systematically."

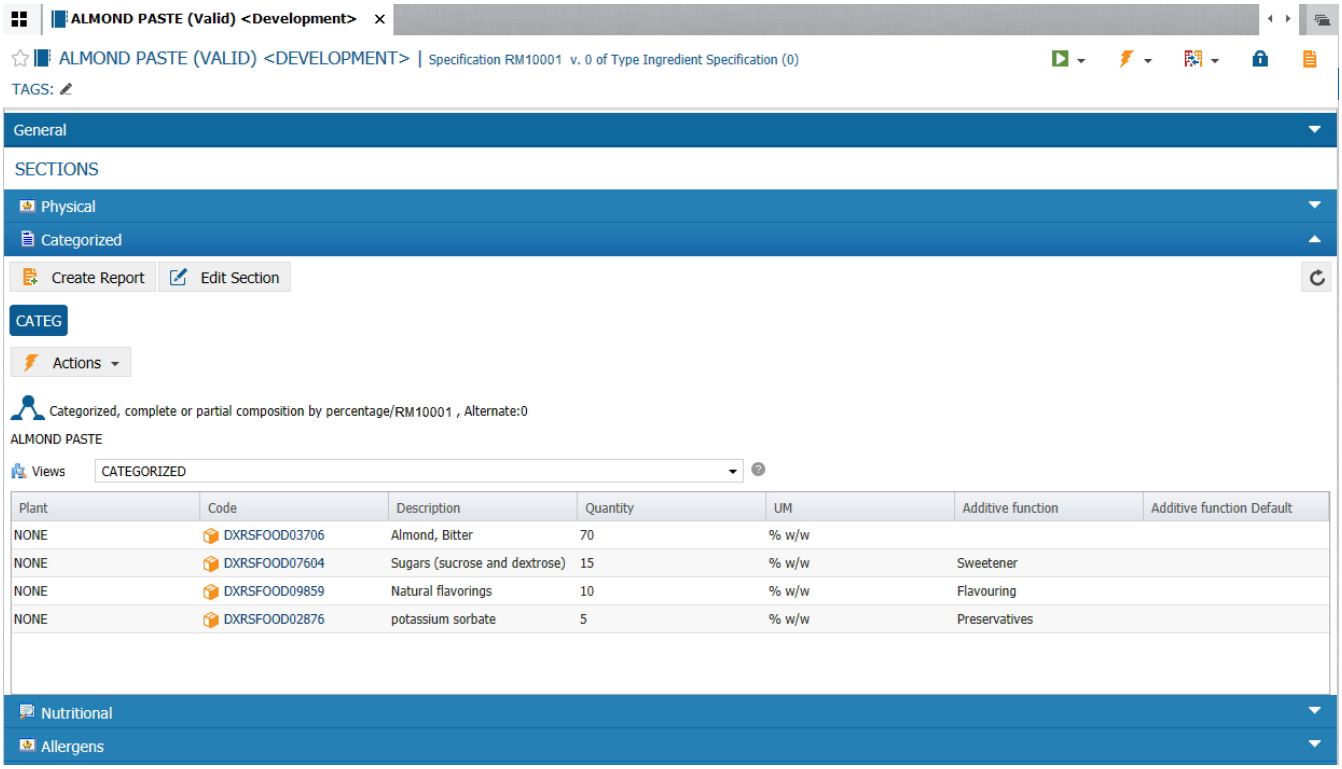
"We needed to have a system that integrates all formula information in a single location. "If you're not managing the traceability process with a centralized, fully integrated system, then you are wasting valuable time. Everybody knows the number of questions you are getting is only going to increase"

Lack of Transparency in Formula Components

Identifying problematic ingredients without a connected system is like finding a needle in a haystack. For example, the Alcohol and Tobacco Tax and Trade Bureau (TTB) regulates the use of sodium nitrate in certain alcohol products. Without total transparency, finding all the formulas that contain even a tiny fraction of sodium nitrate is almost impossible without a federated search system.

Increased Compliance Risks

A lack of traceability increases compliance risks from inaccurate labeling. Beyond fines and potential health concerns, being able to pivot operations quickly in advance of new regulatory changes is critical for reducing the amount of time spent in non-compliance.



View of the Potassium Sorbate Restrictions Grid screen within the Devex PLM system

Lost Production Time and Cost

If an ingredient is outside of compliance, the time spent re-filing the flavor for approval, creating a new finished and approved product and potentially updating the labelling process can greatly disrupt and stop productions. At every step, the math for these decision points can be incredibly complex, and it's becoming more difficult to avoid these time-consuming steps without a system that automates part of the process.

Decreased Consumer Trust

Product recalls make any consumer recoil, but not having a timely response from pulling products off of shelves or changing manufacturing and product formulas, can instantly kill credibility.

3 How Formula-Based PLM Facilitates More Efficient Traceability

Selerant's Devex PLM streamlines the process of preparing for and responding to new food safety standards and crises by offering comprehensive details on product attributes, specifications, recipes and ingredient lists in one place.

Because formula data and documentation is contained and generated in one system, quality control groups can find the information they need on a daily basis to make informed decisions about how their product formulas were built and affected by ingredients and suppliers.

For Bookstore, implementing PLM for traceability began with Quality Control group and was championed by Research & Development.

"You have to stay in front of the regulations and operate in that pro-active space," said Bookstore. "With Devex, all of your information from your formula down to parts per million can be get opened and broken out in a detailed fashion. It's in one place and integrated to the point where I can answer questions accurately, and efficiently." says Bookstore, noting that not using a PLM system is not optional to compete in today's market."

Core Attributes of Efficient Traceability

Devex PLM provides the tools to:

Prevent Risks Proactively

- Do we have controls in place that identify when non-compliant ingredients are being used?
- Does our labeling accurate reflect the product attributes we are required to list?
- Do we know which regulations are changing in the countries we source and distribute in?

Prepare and Manage Upcoming Product Changes

- How many formulas and ingredients are affected?
- What are our options for replacement?
- Can we forecast how long our production will be affected in response?

Respond Quickly to Regulations and Recalls

- Can we find where the problem ingredient live across product variations?
- Can we track the batches that were affected?

Recover Customer Trust

- How quickly can we communicate that we've addressed the problem with our customers?
- Do we need to submit our flavor and products for approval to regulatory agencies?

Benefits of Selerant's Devex PLM for Traceability

Manage and Identify Formula Variations

Selerant's Devex PLM centralizes all formula variations, making it easier to identify where problem ingredients may live in your products. For instance, if a carbon dioxide supply was contaminated across a global product lines that affects numerous materials and variations, Devex can output how many formulas were exposed to the allergen and track which product batches used the contaminated supply, leading to faster containment.

Easily Update Ingredients Across Product Lines

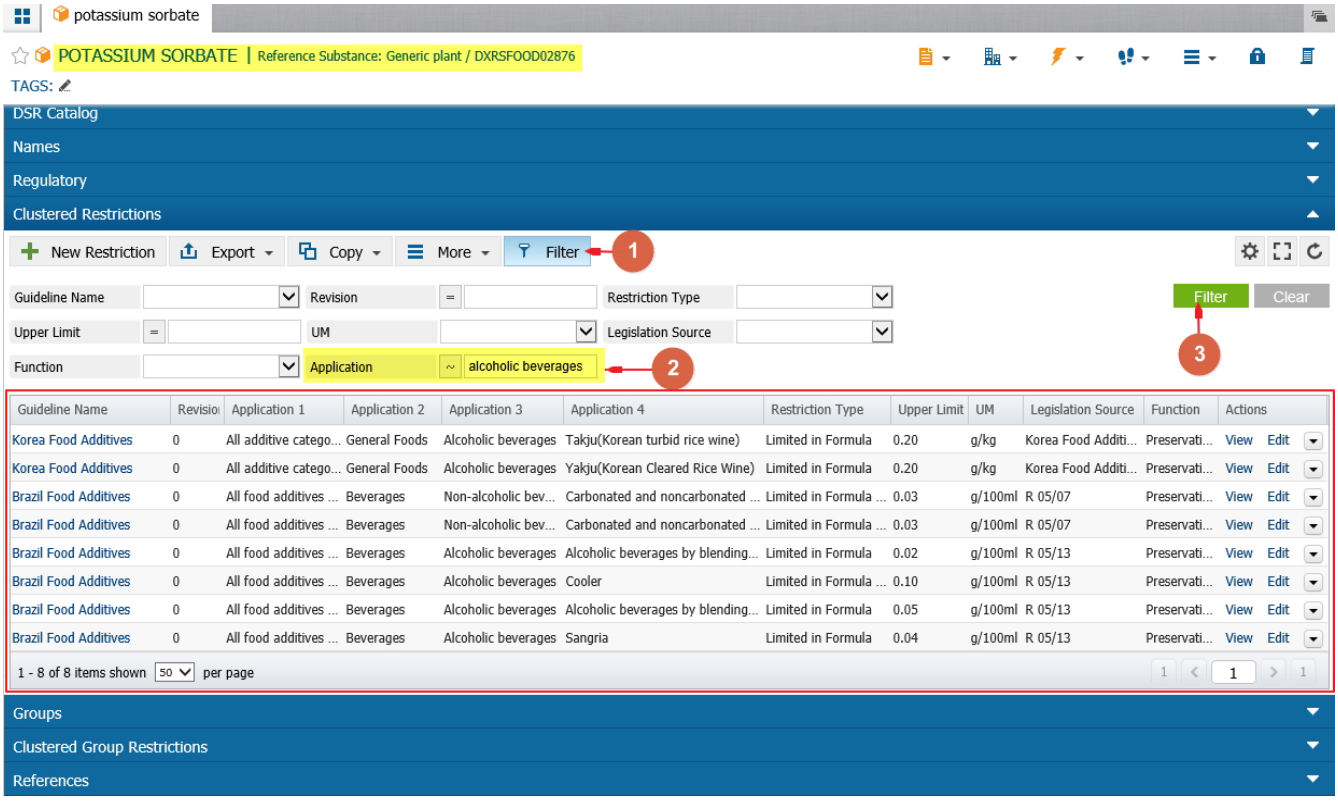
Devex enables you to quickly implement ingredient changes into multiple products at once. For example, European regulatory bodies delisted a specific additive that gives juice-like appearance to citrus-based beverages. In response, Bookstore had to update 70 different formulations with a different cloud-based component. By using Devex, Bookstore was able to do a search to find all the affected formulas and start stability testing.

Perform More Accurate Calculations

The functionality of Devex helps efficiently manage all the critical details within your production formulas. For example, when reviewing the alcohol density for company's RTD line, Bookstore has to work with components that are buried layers deep. Having the ability to break this out with only a couple clicks is powerful.

"Almost every company is going to have multi-layered formulas. Devex breaks out all the components and does the calculations for you," says Bookstore, "You don't have to rely on human error to calculate a base of a base of a base."

Benefits of Selerant's Devex PLM for Traceability



▲ View of the Potassium Sorbate Restrictions Grid screen within the Devex PLM system

Standardize Compliance and Cost Thresholds

Bookstore was able to use Devex to set threshold parameters for ingredient and material attributes. If an ingredient or property must be under a certain ratio to be economically viable, Devex can automatically perform these checks. This set-it-and-forget tool instantly standardizes prevention as products develop and evolve.

"Devex allowed me to set up the standards and thresholds for my materials and gives me a check mark for each requirement," says Bookstore. "Once you've built it in and verified it, you don't have to keep repeating this step."

Case Study: How Brown-Forman Uses PLM for Sugar Traceability

Like all companies, Brown-Forman's ingredient sourcing comes from multiple suppliers and countries. Being able to drill down by country, ingredient and cost analysis is imperative for not only knowing which formulas are in use but quickly changing production to be as cost-efficient and compliant as possible.

BROWN-FORMAN

One of the ways that Brown-Forman uses the full scale of the Devex PLM system is to track and update which sugar types it is using its alcohol products. Numerous factors go into which type of sugar is used for various markets. The decision may be driven by regulatory, economic, climatic, product type, or a combination thereof. Background information is fully integrated into each type which allows efficiency when deciding.

Using Devex PLM, Brown-Forman built in a cost calculation into their formula specifications that allows them to determine which sugar type is most favorable within different product lines.

Devex handles each step in the formula change process, such as:

- Calculating the cost of using a different supplier or ingredient
- Identifying which formulas would be affected by ingredient changes
- Creating ingredient statements listing the all product attributes and where they reside within product lines
- Creating new formulas and updating ingredient lists across material masters
- Managing the creation and submission of custom service documents for country registrations
- Activating and deactivating formulas and specifications as needed

Bookstore said the real ROI of using isn't just in time and money saved, but in the peace of mind of having an efficient, preventive system in place for knowing your products and formulas inside and out.

"You have to do this as efficiently as possible, it's only getting more and more complicated. If you have to do that in any manner that isn't as efficient as this system, you are wasting time."

Conclusion

As food safety, inspection and regulatory standards have evolved to focus on preventative measures, food and beverage manufacturers must build in more efficient procedures for monitoring, scoping and changing the traceability of their product ingredients. Research & Development, Compliance, Product and Innovation and Accounting teams must all be able to respond quickly together to regulatory changes, and companies working with paper or disconnected digital systems are behind the curve.

Devex formula-based PLM software eases the burden of traceability by providing the tools to research and answer internal and external questions around product integrity, ingredient ratios and regulated product attributes, as well as quickly update formulas in response to changing rules and compromised supply chains. Using a PLM system moves companies squarely into the prevention model of traceability and into the modern age of food and beverage safety.

About Jimmy Bookstore

Jimmy Bookstore is the VP of Product & Process Development Brown-Forman. Prior to his 9 years at Brown-Forman, he spent 17 years at Bacardi. With his combined 26 years of experience in the Food and Beverage R&D space, Jimmy can attest to the many trials and tribulations associated with bringing new products to market on a global scale. A Selerant customer since 2010, Brown-Forman works closely with the Selerant team to continually improve upon the Devex PLM product and make sure the tool meets the organization's many visibility and traceability needs. When he is not innovating, Jimmy spends time with his family and enjoys coaching his son's baseball team.

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