All the right ingredients for packaging innovation

Vonco Products and C&F Packing Company help Smithfield Foods expand into a new market with an innovative steamer pouch.

Our vision for the meatballs and sauce was a single package that could go from the freezer right to the microwave for maximum convenience. That meant the packaging itself was now also going to serve as the cooking container, and that was new territory for us.”

Ashley Spokowski
Senior Packaging Engineer for Innovation
Smithfield Foods
The concept for the new offering seemed simple enough: Take an existing frozen meatball product and enhance the customer experience by including sauce in the same package. But doing so would require a new approach to the packaging. “With our current product, people typically heat the meatballs in the oven, in a skillet, or in a microwave, and then add sauce as a separate step,” said Ashley Spokowski, Senior Packaging Engineer for Innovation at Smithfield.

“Our vision for the meatballs and sauce was a single package that could go from the freezer right to the microwave for maximum convenience. That meant the packaging itself was now also going to serve as the cooking container, and that was new territory for us.”

And convenience can be a powerful motivation for consumers. According to Deloitte’s 2015 American Pantry Study, 45% of consumers said they had purchased products primarily because they made it easier to prepare a meal. Among the same group, 35% had also purchased a product because it featured convenient packaging.

To make that vision of convenience a reality, Smithfield turned to C&F Packing, a third-generation family-owned packing company in Lake Villa, Illinois. The two companies had worked together on previous products, but primarily in the food service and ingredient categories, so this new endeavor represented uncharted territory for both Smithfield and C&F.

Starting at square one

Bob Madderom, Business Development Manager at Vonco, coordinated the project from Vonco’s side and assembled a team of experts to understand and address the unique challenges of the assignment. “It was clear this wasn’t going to be an ‘off-the-shelf’ situation,” Madderom said. “So, rather than try to adapt an existing solution, we started with the food itself and engineered a solution around it.”

The team decided to start with a flexible pouch as the foundation, but that was just the beginning of the process. The finished packaging had to be easy to fill and freeze; then withstand microwave cooking temperatures and present a safe, flavorful, and visually appealing product for the consumer. As the team was to discover, there were quite a few variables to consider, and those variables would put Vonco’s material science expertise — and ability to create rapid prototypes — to the test.

VENT TECHNOLOGY

Cooking the sauce and meatballs in the pouch meant there had to be a way for the steam generated by the cooking process to escape. Pouches used for cooking vegetables often incorporate perforations or pre-made pinholes, but Smithfield’s guidelines stated that the packaging had to be hermetically sealed to protect the food from the environment before cooking. In addition, the team wanted a way to maintain a certain level of pressure within the pouch during the cooking process to ensure more even heating.

The solution came from one of the food science experts Vonco brought in for the task, Bob Mitchell. “I’ve done extensive testing on all steamer vent technologies available in the marketplace with the Food Science Department at Purdue University. This work was done using equipment that tracked the temperature of the food and the pressure of the packages as they came up to cooking temperature. The steam vent technology used by Vonco featured a mechanical action that reseals the vent if the internal pressure drops below a certain threshold, which brings the package up to temperature quickly and maintains the pressure in the package throughout the cook. We believed this solution would provide the kind of consistency Smithfield and C&F were looking for.”

In addition to the type of vent used, the vent position needed to be carefully considered because the pouch would contain liquid. While the steam needed to escape, the sauce needed to be contained. After several prototypes and tests, the optimal solution was determined.

We knew Vonco had extensive expertise when it came to creating custom solutions.
POUCH MATERIAL/CONSTRUCTION

Unlike with vegetables, cooking with proteins, sugars, salt, and fat results in higher temperatures and “hot spots” in the pouch that can cause damage to the material. Since the meatballs needed to reach an internal temperature of at least 165°F, the team realized that custom pouch construction was necessary.

That meant testing a wide range of materials in many different combinations and configurations to achieve a solution that could withstand the cooking temperatures and maintain a liquid-tight seal to contain the product and protect it from contamination.

And, to ensure that the pouch would be safe to handle after going through the cooking process, the engineers incorporated “cool zone” disks into the top portion of the pouch.

FOOD FORMULATION

Beyond the variables involved in the pouch specification and construction, the formulation of the sauce and meatballs themselves had an impact on the pouch performance. It took several iterations of adjusting the proportions of sauce and meat — and even tweaking the individual recipes to balance the ingredients overall — to achieve the most even cooking performance and the most visually appealing end result.

COOKING TIMES

Engineering a pouch from scratch for a new product also meant developing cooking instructions from scratch. Taking into account the variability of microwave oven cooking power, and the fact that the product would be in a frozen “brick” configuration initially, the team developed an optimal set of instructions that were easy for consumers to follow and provided the most consistent performance.
Development and testing

Throughout the development process, weekly conference calls were held with key project stakeholders from Smithfield, C&F, and Vonco. It was an extremely collaborative process for all parties involved — packaging engineers, project managers, food scientists, and operations alike.

For each iteration of testing, pouches were constructed in Vonco’s manufacturing facility, then sent to C&F for filling and freezing. Initial testing was performed back at Vonco’s in-house prototype lab, allowing for quick turnaround as the pouch parameters evolved. At key points in the process, larger runs of pouches were produced, filled at C&F, and then sent to Smithfield for testing.

“We tested more than 200 bags over a six-month period,” said Spokowski. “We were measuring sauce coverage at five different points when the pouches were opened to ensure optimal appearance. We also had to make sure every meatball was consistently 165 degrees on ten consecutive trials.”

“**This was an excellent opportunity to demonstrate our expertise in flexible packaging printing.**”

In addition to the performance characteristics of the pouch, there were also aesthetic considerations, as the product would be sold in a retail setting where visual appeal is key.

“This was an excellent opportunity to demonstrate our expertise in flexible packaging printing,” said Keith Smith, President of Vonco. “Not only did we match the brand’s PMS color precisely, we ensured the product photography was faithfully and consistently reproduced for an eye-catching retail appearance.”

Into the market

Smithfield launched the sauce-and-meatball product in select markets in the summer of 2016 with two different types of sauces — marinara and a spicy arrabbiata. So far, consumer response has been positive.

For C&F Packing, the experience has been educational. As Mark Freda put it: “This was our and Smithfield’s first foray into a sauce-added product. And there was definitely a learning curve. Vonco did a really great job bringing resources and expertise to the table. Any time you’re dealing with innovation, you’ve got a lot of moving parts, and we were able to put all our heads together and work through the challenges.”

From Vonco’s perspective, it was an excellent opportunity to leverage its core strength of solving customer challenges. “The standup pouch is definitely a growing market, and we see tremendous opportunity to enhance the functionality of this flexible option to enable a wide range of convenience-type foods,” said Smith.

But the story doesn’t end there. Vonco is currently exploring new opportunities with a variation on the steamer pouch solution it has developed for a sauce-and-seafood combination.

About Vonco

Vonco has been creating high-performance flexible packaging solutions with expertise in materials, bag, pouch and sleeve design, seals and closures for more than 60 years. In-house tooling and die design support customized solutions from concept through production to satisfy customer goals and enable speed to market. For medical, industrial, security, food or promotional applications, Vonco is known for performance that delivers.