

## Adding Value to Seafood: Facilitating Innovation through Partnerships

By Barry Nash, Charles Hudson and Dan Kauffman

Sunburst Trout Farms was not selling all of the fish meat it produced. Its trout fillets and other value-added products sold well, but good meat remained on the fish frames after the fillets were cut. The frames, with the meat, were being tossed. Why not recover that meat and turn it into another profitable value-added product?

Located in Canton, North Carolina, Sunburst already

had a successful value-added track record. “Value-added is critical to our success,” says Sally Eason, Sunburst’s chief executive officer. “Before, when we were just selling trout, we seldom made money.

Value-added made us profitable. New products are now 40 percent or more of our business. You’re not going to get rich farming fish, but enhancing the value of trout to consumers allows us to be consistently profitable.”

A broad view of adding value is transforming seafood from its original state to a more marketable state, so its sensory qualities or convenience of preparation are more pleasing to consumers.

An example would be to increase the economic value of headed shrimp through peeling and deveining, so the final product is ready-to-cook right out of the package. Restaurant chefs and retail customers would be willing to pay extra money for the convenience of not having to peel and devein shrimp themselves.



Top: Sunburst Trout Farms is located in Canton, NC. Bottom: Sunburst developed a trout burger to utilize fish protein.

The “produce-and-sell” mindset of many seafood processors is evolving into a market-oriented outlook, one where they consider attributes consumers want in their food and then create products having those desired features. This outlook allows processors to produce a differentiated product that is not a simple commodity.

Similar products compete against each other, but

differentiation allows producers to have some choice about pricing. The market for value-added seafood is increasing because consumers have little time or interest in cooking their own meals.

Mike Boland of Iowa State University explains, new technologies allow producers to meet consumers’ rising expectations for health, nutrition and convenience.



Top: Trout burgers are easy to cook right out of the package.

The creative process of adding value to seafood is illustrated by the way that Sunburst addressed the challenge of using the underutilized meat after filleting. In business since 1948, Sunburst is the largest East Coast producer of value-added seafood made from farmed rainbow trout. The company’s product line includes caviar and spreads, as well as marinated, encrusted, hot- and cold-smoked fillets. Ninety percent of the company’s customers — restaurants, grocery stores and farmers markets — are within 400 miles of its headquarters.

## The Challenge

When trout were processed into premium fillets, a substantial portion of meat near the backbone was discarded. In chunk form, this high-quality meat had no economic value in the high-end markets Sunburst serves. Sunburst searched for ways to transform the meat into products its customers would purchase. Earlier trout burgers never entirely satisfied company officials.

“We used Japanese Panko bread crumbs to bind the meat but that made it taste like it had filler in it,” Eason recalls. That original burger was dropped from the company’s value-added lineup, but the idea of a burger that could meet company standards was still appealing.

Charles Hudson, then Sunburst’s research chef, wanted to formulate the meat morsels into a product that would mimic the flavor and texture of a traditional beef hamburger. The primary issue confronting him was

(NC). To achieve a final texture that resembled a beef burger, Nash recommended the meat base be blended with textured soy protein (Response 4400 IP, The Solae Company, St. Louis, MO) and powdered shortening (Item No. BDF 0412, Bluegrass Dairy & Food, Inc., Springfield, KY). The soy protein and powdered shortening were sourced from Skidmore Sales & Distributing Company of West Chester, Ohio, a broker of industrial food ingredients. Salt was added as a flavor enhancer.

Because the intended consumer for this product values all-natural foods, Sunburst wanted an ingredient label that did not list artificial colors, preservatives or genetically modified ingredients. Hence, the textured soy protein was not derived from genetically modified plants.

## Developing a Formulation

Nine formulations were evaluated. In each, the level



*Top left: A rainbow trout. Top right: Trout are mechanically filleted. Bottom left: The extra meat from trout frames must be removed by hand. Bottom right: A trout fillet.*

the texture of the ground, cooked meat morsels. Ground hamburger can contain up to 30 percent fat, while trout has approximately 5 to 6 percent total fat. The lower fat content in the minced trout chunks produced a very firm, “hard” mouth feel relative to hamburger. In a feature story in North Carolina Sea Grant’s *Coastwatch* Autumn 2014 issue, Hudson and Barry Nash, North Carolina Sea Grant’s seafood technology and marketing specialist, explained the lower fat content was the cause of the texture problem.

The meat base of the trout burger consisted of minced trout fillets, meat from the backbone of filleted trout, and catfish meat (Carolina Classics Catfish, Ayden,

of ingredients was varied to achieve a specific product cost without sacrificing the desired sensory attributes of a burger. The goal of formulating was to attain the lowest cost of manufacturing, distributing and selling the burger while maintaining its exceptional palatable quality.

Product developers must take into account several factors when determining a suitable price point for any value-added food. The first consideration is learning the price sensitivity for a particular market or target customer. The trout burger was formulated primarily for the restaurant trade. Two of the most critical costs in the food-service industry are labor and food, known as prime costs. The cost of food and ingredients as a

percentage of total operating costs ranges from 25 to 38 percent, according to an article by Steven Buckley in *The Houston Chronicle*.

Knowing this statistic, Hudson analyzed the menu prices of several target restaurants to establish the cost of a single burger. The final cost of a four-ounce patty assumed the burger would include other accompaniments, such as buns, condiments and side dishes like french fries.

Sensory evaluations or taste tests were conducted on each formulation to ascertain the degree of overall acceptability. Hudson conducted informal evaluations among his company's staff while formal sensory trials were organized by Nash at North Carolina State University's Center for Marine Sciences and Technology (CMAST) in Morehead City. The feedback received from Sunburst staff and the CMAST panels were used to

Scores can be favorable even when panelists' comments seem to indicate formulation adjustments are needed.

For instance, a panelist may rate a particular sensory attribute at 5 (Good) or higher, yet provide a slightly negative assessment of flavor, texture, color or appearance. The goal in relating the comments of panelists to the numerical sensory scores is to identify recurring criticisms. For example, the flavor score for a product may average 5.5; however, seven of 12 panelists note the item needs more salt. It may be prudent to increase the level of salt to address the perceived deficiency, and then test the product again to ensure the salt content meets panelists' expectations.

During the formulation process, some product samples began to show signs of rancidity during frozen storage. To control this, an all-natural antioxidant was added to the formulation to minimize the deterioration



*Top left: Trout burgers taste great grilled. Top right: Sensory panelists rate flavor, texture, color and appearance. Bottom left: A fillet is ground for trout burgers. Bottom right: The burgers can be served in a variety of ways.*

adjust the overall formulation to deliver a flavor profile and texture reminiscent of a beef burger while remaining within a targeted cost range.

The CMAST panelists were asked to rate the flavor, texture, color and appearance of their sample according to a Hedonic Scale where 7 = Excellent; 6 = Very Good; 5 = Good; 4 = Fair; 3 = Poor; 2 = Very Poor; and 1 = Terrible. They were also directed to provide commentary on what they specifically liked and disliked about the burger. The average flavor scores during the developmental process ranged from 5.5 to 6.5 (Good to Very Good). Numerical scores, however, are always evaluated in conjunction with the panelists' comments.

of the trout's natural fat. The first antioxidant tested contained sage as a critical ingredient. While CMAST panelists evaluated the product highly, they noted the burger tasted like a breakfast sausage, which was not the flavor profile Sunburst wanted.

To eliminate the sage note, a flavor-neutral or "deodorized" antioxidant was substituted for the original antioxidant (Flavor Stabilizer Type S, Skidmore Sales & Distributing, West Chester, OH). To further ensure the flavor would be maintained during frozen storage, the burgers were vacuum-packed in flexible, oxygen-permeable film (Cryovac 10K OTR [Oxygen Transmission Rate], Elmwood Park, NJ).

## Finalizing the Product

After considerable sensory analyses and ingredient adjustments, the final formulation contained:

Recovered trout meat chunks:	35-45%
Rainbow trout fillets:	15-25%
Catfish:	15-25%
Powdered shortening:	6-9%
Textured soy protein:	3-6%
Antioxidant:	2-4%
Salt:	< 2%

## Initial Marketing

Once the final formulation was completed, the trout burger was introduced to the public for the first time at the Appalachian Sustainable Agriculture Project's Annual Summer Solstice Soiree on June 21, 2014. Known as ASAP, the project has a mission to encourage the production and consumption of local food.

"There were about 100 people there and everybody loved it. It got huge reviews," Eason recalls.

From there, Sunburst introduced the product to local chefs who also gave it good reviews and are starting to buy it. Eason expects the burger will gain traction as it gets on the spring menus in the area.

Eason is confident the burger will be profitable. "It will provide a significant margin. There is a lot of labor in it, but ingredient costs are not high because we are recovering meat from the frame."

Sunburst is delivering trout burgers to restaurants on their own trucks in wholesale quantities priced at \$8 per pound. The product has potential for online sales as well, but Sunburst has not pushed that market while working on the production process. "We are getting the meat off the frames by hand, but are examining how to do it mechanically. We're taking time to choose the right machine," Eason notes. When the product does go online, she expects strong sales. "I think it will be a great Christmas gift item."

For more information on overall product-development, see North Carolina Sea Grant's Ready-to-Sell: Developing Value-Added Seafood Products, available online at: [http://ncseagrant.ncsu.edu/ncseagrant\\_docs/products/2010s/bp\\_readytosell.pdf](http://ncseagrant.ncsu.edu/ncseagrant_docs/products/2010s/bp_readytosell.pdf)

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