

Innovative Processing and Formulation Technologies

David H. Hull

UMBRELLA OF CREATIVITY

Innovation is key to surviving and thriving in today's world. Innovation in combination with creativity can provide positive synergy to take a company to a competitive advantage. The concept of an "umbrella of creativity" will be showcased today to illustrate key deliverables. Anchored in creativity, the umbrella will address art, science, process technology, consumers and cost as we consider the manufacturing of processed meats. Here is a brief description of the components of the creative umbrella.

Art

This references the creative flair that Processors use to differentiate their products. It also relates to subjective interpretations of product and process variables used to create new processed meat products. Many smaller, local meat marketers have made remarkable meat based products to serve to their local customer base for years. Many of these products are becoming mainstream as spoilage prevention and food safety technologies have advanced. Today we will discuss some new product ideas that utilizes the art of processed meat development.

Science

Meat processing is of course science based. Every major meat processing company has a group of individuals working in R&D, QA/QC, and/or Technical Services. With the science associated with Food Safety as an endemic need to maintain a viable industry, science is also key to Production and Product Development. It is important to embrace meat science, as well as food science. The area of food science brings non-meat ingredients into the mix. These ingredients further enhance the ability to bring "art" along with "science" to meat processing.

Process Technology

Suppliers to the meat industry continue to offer an array of new process technologies. In the steak processing world, we now have portioning technology that can slice meat at 1500 cuts per minute or 25 cuts per second! New high speed slicers that cut on a bias are also available. This greatly helps with plate presentation as steaks cut on a bias have greater plate coverage. Equipment used to 'form' meat and poultry can operate under lower pressure to provide whole muscle texture for ground products. We will review a variety of these technologies that are new to the industry.

Consumers

Whatever we do, whether it is process or formulation innovation, it has to be accepted by consumers. Many new technologies have come and gone because they did not satisfy an unmet consumer need. The current state of the industry suggests historically high meat protein prices for the foreseeable future. Companies who can provide creative, unique value propositions will garner market share.

Cost

To list cost as a key attribute is somewhat presumptuous. It is preferable to use the term value. However, the ideas discussed today will be heavily geared toward cost reduction. Thus cost will be the main driver for the value equation.

CREATIVE PROCESS AND FORMULATION PLATFORMS

Creative processing techniques will be described for chicken, pork and beef processing. With the diverse audience in attendance today it is essential to cover a wide range of applications, but time constraints will prevent a detailed presentation for each. Highlights of innovative process and ingredient application studies will be showcased. Samples of these products will be shown to illustrate.

David Hull, Ph.D.
1405 Wade Haven Ct., McKinney, TX 75071
dahulla@yahoo.com

CHICKEN

Out of all the types of poultry trims to discuss, we will review the lowest cost form. Specifically, mechanically separated chicken [MSC] will be showcased via a live demonstration. Although this raw material is low cost, with a little art, science and processing technology, a lower cost 'work-in-process' raw material will be made. The product will have enhanced consumer friendly characteristics, and thus we will have addressed all areas of our "creative umbrella".

Cold meat binding will be utilized for this demonstration. Because of the low cost of MSC, the only economical choice for cold meat binding will be the utilization of sodium alginate. Other cold meat binding technologies, (e.g., enzymes, blood proteins), do not offer an acceptable "cost per unit of functionality" for this application. Alginates are a highly functional hydrocolloid, which when combined with the appropriate calcium source, allows the MSC to manage a large amount of water. It is possible to extend MSC more than 200%! In addition this product will now be grindable, versus its normal paste like physical state. This may allow it to be utilized into coarse ground processed meats. The picture below shows a sample of MSC next to a 200% extended MSC gel.



PORK

Pork trim is a valuable raw material to the sausage industry. Relative to the value of beef trimmings, pork is cheap. And relative to the value of bacon bellies, pork trim is cheap. This lends itself to some creative processing.

Pork Trim Bacon

Bacon is a very popular processed meat. While it typically is made from pork bellies, you also see pork jowl

bacon and pork back bacon sold. The idea of making a pork bacon belly, from pork trim, is economically attractive. This can be done by utilizing cold meat bonding technology. Again alginate is the logical choice as it is functional, and can bind fatty meat trim. The creative key to doing this is solving the issue of sodium interfering with the bind. A combination of ingredient technology and process technology can be utilized to make a bonded raw pork belly, from any blend of fatty or lean trim. Once this belly has been formed and held for ~24 hours, it can now be processed like a regular pork belly. This includes injection with a brine solution. Since the alginate bonds are formed, the sodium from the brine will not significantly interfere with the bonds. Thus, we can have the flavor profile of bacon and texture that we expect. Appearance of the sliced belly can also be optimized with innovative processing techniques. This won't be discussed in detail here, but commercial options do exist to provide typical lean muscle patterns in the bacon slice. The picture below shows the bonded pork trim belly in the smokehouse next to belly bacon.



Boneless Pork Ribs, and Wings

Low pressure forming equipment can also utilize pork trimmings to make innovative new products. This includes pork nuggets, pork wings [made to resemble chicken wings], and boneless pork ribs. Samples of these products will be shown to illustrate the impressive appearance for these formed items.

BEEF

The beef supply situation is currently extremely tight. Prices for fed cattle, cows, feeder calves are at historical highs. The subsequent sub-primal and beef trim prices are also high. A demand shift to other low cost proteins are a real concern to this industry. Creative ways to provide beef based processed meats are more important than ever. Processing techniques to increase yields are also critical.

Streamline Processing

Streamline deboning and trimming systems enable meat processors to monitor and collect data on yield, throughput and quality throughout the entire processing cycle. The systems are fully-customized, and include various modules. Modules include: trimming according to set specifications, online monitoring via intelligent control software, intake and registration, breakdown, deboning and trimming, individual or bulk packing, freezing, portion cutting, robot batching, sealing and labeling, and palletizing. Critical key performance factors are closely monitored and controlled in real-time. These include: yields, throughput and efficiency, giveaway and loss of sales, quality, stock levels and movements and profitability. There is also a built-in traceability mechanism at all levels, ensuring that all product information is registered throughout the entire production process, making recall easier if needed.

Plate Coverage for Steaks

Traditional hand cutting or automated portioning for steak processing involves making a 90 degree cut at various thicknesses. New automated portioning systems are designed for cutting meat into portions at a consistent angle. This allows a Processor to quickly and accurately cut steaks to a large surface area. You can operate with objectives of fixed steak weight, yield optimization of the scanned sub-primal, or fixed angle + thickness. The steaks in the picture show beef sirloin flap cut at a 90 degree angle VS a 35 degree angle. Both steaks are the exact same weight, but the plate coverage is radically different. As beef prices rise, and steak portion weights decrease, an angle cut will give a better value impression for the customer.

Cost Savings

In addition to the new process technologies for beef, the same ingredient technology that was previously discussed can add value here too. Beef trim is sold on a reverse lean point value. In other words "Beef 50's", are traded on the



basis that they contain 50% fat. Beef 75's have 25% fat, Beef 85's have 15% fat, and so on. The lower the fat, the higher the price based upon supply demand economics. Thus if you use cold meat binding, and hydrate the trim, you can make low cost beef trims by effectively lowering the fat level in the trim. The product now contains beef, water and other ingredients, so it can only be used in processed meats that allow binders.

SUMMARY

In summary we discussed the concept of a creative umbrella to address innovative process and formulation technologies. Examples were given of newly commercialized products and processes, in addition to some creative concepts that could become reality with a little art, science, and technology that focuses on consumers and controls cost as we strive to add value to processed meats. I believe that if you do not embrace process and ingredient technology then, indirectly, you have chosen to compete against it.