



ZEIGLER®



nutrition through innovation



LighthouseVision





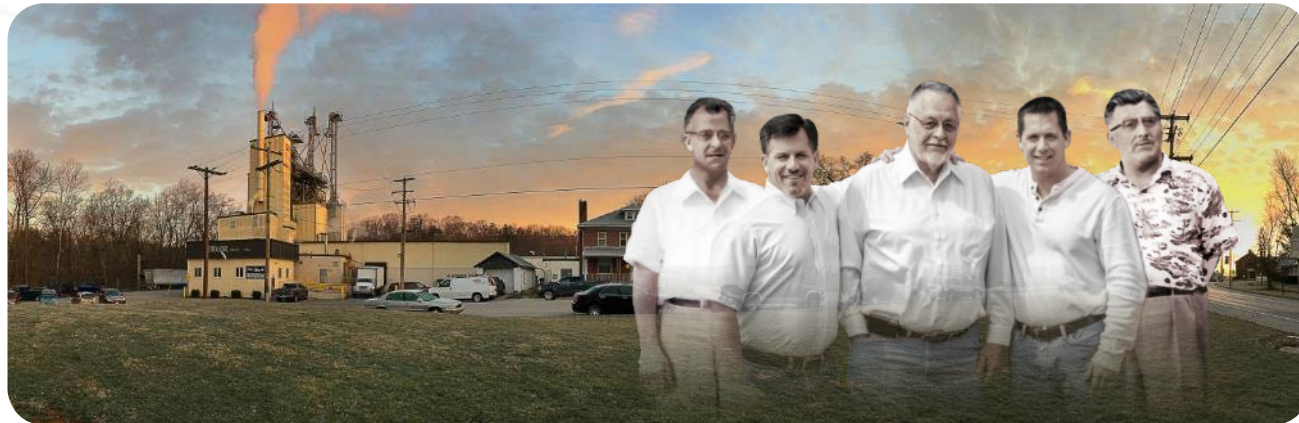
Thomas D. Welch

Global Aquaculture Specialist

zeigler BROS., INC.



Zeigler Profile



- Founded in 1935 – 90 Years in Business
- Based in Gardners & East Berlin, Pennsylvania, USA
- 3rd generation family ownership and management
- >100 employees, 4 PhD's





PERSONAL TOUCH

3 GENERATIONS, SINCE 1935

Core Values



Love

of customers,
job, and life



Integrity

in all that we say
and do



Value

in our ongoing
contribution



Elegance

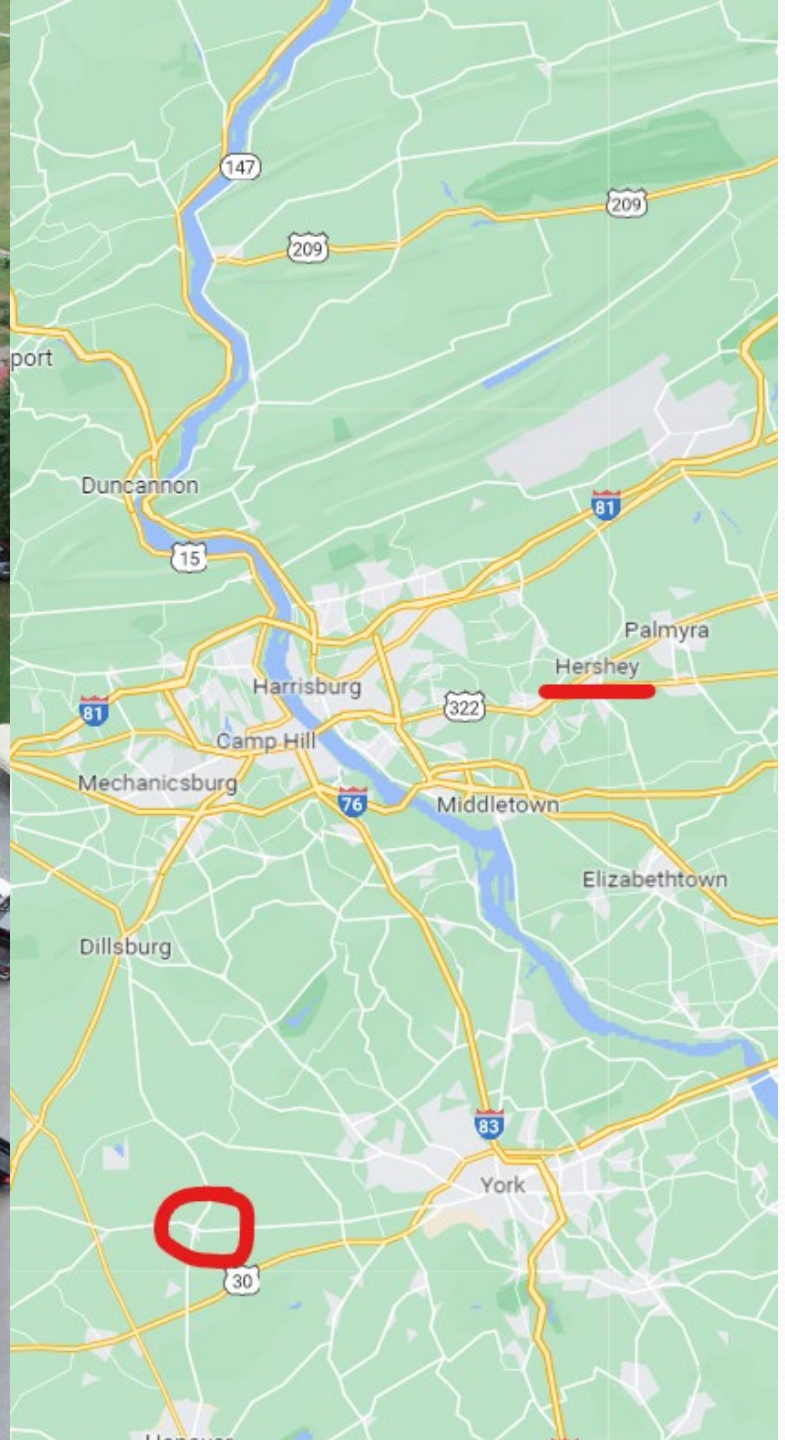
in performance as
a team

We **LIVE** our corporate lives through
Love, Integrity, Value & Elegance

Facilities

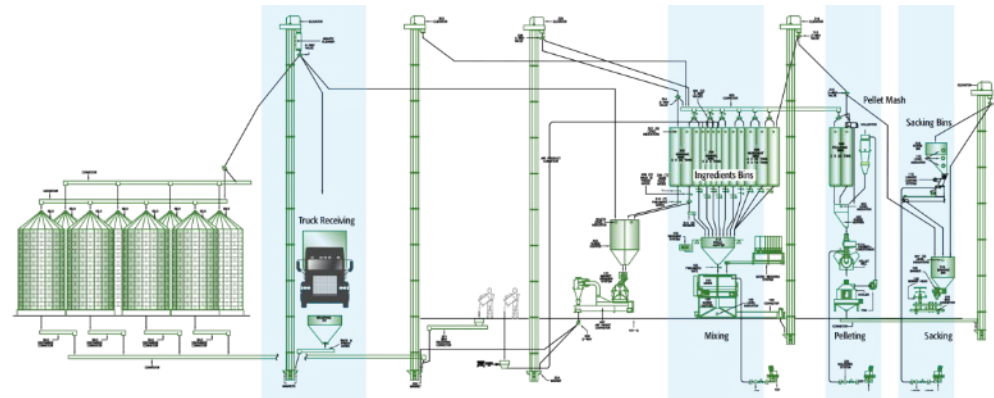


- Located in East Berlin, Pennsylvania, USA
- 7 Distinct Production Lines including Extruding, Pelleting, Flaking, Cold and Liquid Processes
- Certified ISO-9001, EU, Global GAP, NOAA SIP, HACCP



Process Technology

Flake, Extrusion, Pelleting, Liquid, Microencapsulation



The illustration to the left is an example of common plant manufacturing steps. Specific equipment and processes will vary depending on the feeds produced.



liquids



cold processed



small packaging



extrusion



pelleting



micro-particles



premixes



flaking



Research & Development

- Zeigler R&D and Nutrition is staffed with 4 PhD Nutritional Scientists, 2 M.Sc. scientists, 10 technical staff and two R&D facilities.
- ZBI R&D is our in-house feed manufacturing test lab located within our milling operations in East Berlin, PA.
- Manufacturing capabilities include small-scale pelleting, flaking, extrusion among other platforms.

Core Competencies



- Research & Development
- Production Technology
- Nutrition & Formulation
- Quality Systems & Certifications



Quality Control

- Ingredient selection
- Ingredient receiving
- Quality assurance

Environmentally Friendly Feeds

High Protein Digestibility

- Quality protein increase digestibility; leading to a cleaner effluent

Low Phosphorus Levels

- Low levels help to decrease detrimental effects on water quality



Quality Systems & Certifications



HACCP
PROGRAM

WORLD
AQUACULTURE
Society



- Certification Programs

- NOAA-Fisheries
- Global Gap
- HACCP
- ISO 9001





Finfish aquaculture encompasses a broad and increasingly diverse set of aquatic species (finfish are generally defined as having backbones, gills and fins) which have both common and unique requirements amongst their collective group. Some of the key commonalities that are considered when addressing the nutritional requirements of different species of finfish involve their habitat (cold water, warm water, marine, freshwater, etc.), their natural diet (omnivorous, piscivorous, etc.), the life stage of the fish when they are being fed and other general morphological, environmental and production considerations.

Finfish aquaculture encompasses over 200 species of fish in a multitude of systems ranging from extensive earthen ponds to highly technical recirculating systems. This broad biology and environmental diversity impacts the nutritional requirements and feed characteristics. The evolution of aquaculture from general animal rearing to highly specified species by system combinations has led to the development of our new species specific line of feeds. Please contact your Zeigler representative to discover how these new products can help you succeed in your aquaculture business.

Sustainable: Inside & Out. *Feeds for our future.*

To stay at the forefront of sustainability, we combine a long history of sourcing responsibly produced ingredients with cutting edge research and development to identify and utilize the best new nutritional tools.

Vision Statement: *To serve as the global beacon for nutritional innovation, bringing value to the lives of our customers, employees, and communities.*

Quality
Assurance



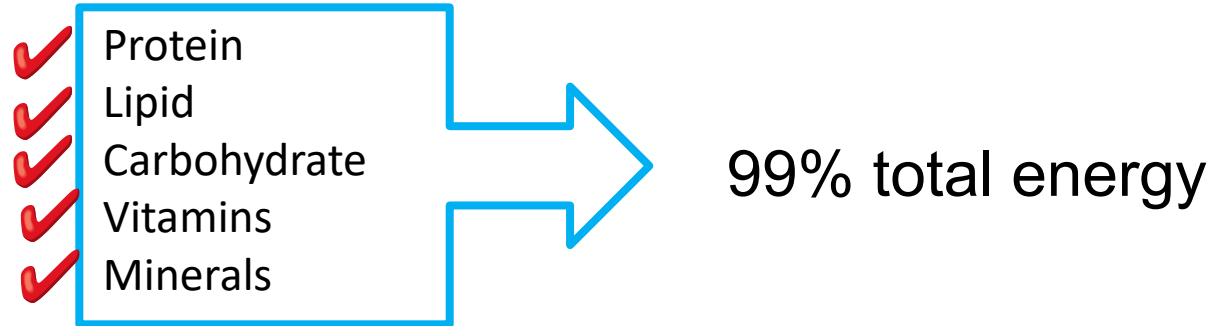
Performance Feed

- **Quality**
 - Zeigler diets are formulated using the highest quality ingredients to ensure optimal digestibility and growth
- **Consistency**
 - Few fines means more usable feed
- **Higher Energy Feed**
 - Medium Energy
 - High Energy for the best feed conversion rates



Fish Nutrition

Five classes for nutrient:



Three major energy source from protein, lipid, CHO.

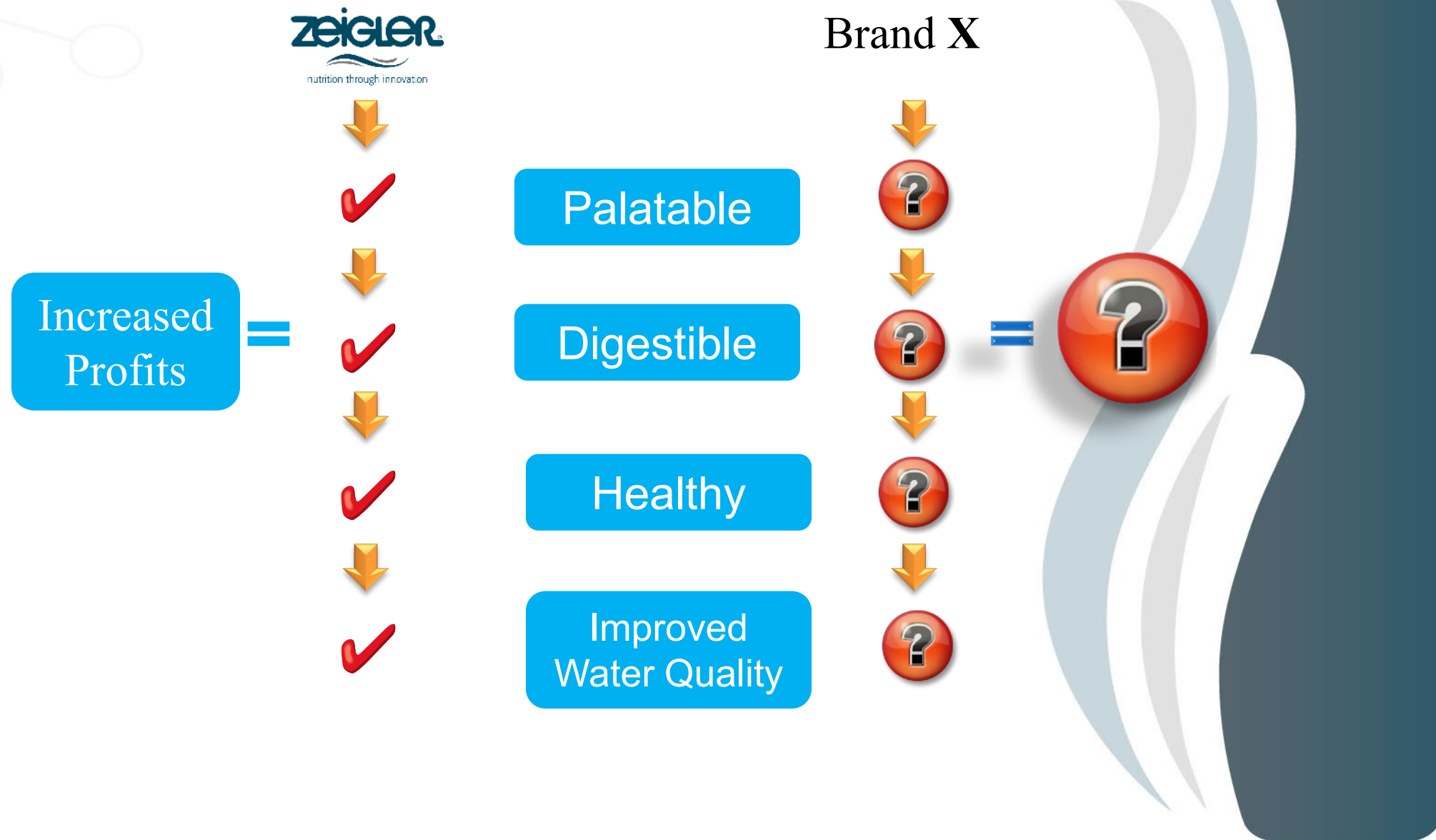
Balanced energy is important

Energy is the true reason animal eat

Energy determines feed intake

Proper energy is important for feed design

Nutritional Decision Tree





Pro-Start w/Vpak



Trout Grower



Hi-Performance



Sportfish



Broodstock

Storage and Handling

INTRODUCTION

Animal feed is a semi-perishable item. Like the bread we buy from the local grocery store or the cheese we keep in our refrigerator, it will spoil given a long enough period of time. We can go to the store every week for new groceries, but this is not practical or economically feasible when purchasing large quantities of animal feed. The question therefore, is how can we extend the shelf life of the animal feed over a several month period.

When we talk about shelf life, it is important to understand what happens to feed under long term storage. The problems encountered with storage or feed fall into four major categories.

NUTRIENT LOSSES

As feed ages, essential vitamins, especially Vitamin C, begin to degrade and eventually become deficient. High temperatures and humidity further speed this deterioration. As manufacturers we deal with this problem two ways:

1. Add excessive levels of vitamins to allow for losses incurred during manufacturing and storage.
2. Utilize stabilized forms of vitamins which resist breakdown in the feed. Zeigler was instrumental in the development of a stabilized form of Vitamin C, L-Ascorbyl-2-Polyphosphate, (STAY C) which has 80 times more stability than standard Vitamin C in pelleted feeds at room temperature (77° F).

This now allows us to maintain adequate vitamin levels six months or more in dry pelleted feed. Studies have shown feed made with Stay C to have adequate levels of Vitamin C even after one year of storage.

As a consumer, you can minimize the nutrient losses of your feed by storing it in a cool, dry, well ventilated location and following the storage guidelines below.

RANCIDITY

Rancidity is the spoilage of the fats and oils present at relatively high levels in most aquaculture diets. Over time, oxygen breaks the fat down chemically, creating undesirable by-products. These compounds can cause several problems, including:

Feed rejection
Off-flavoring of flesh
Vitamin E deficiency
Overall poor growth and health

Rancidity is prevented by adding antioxidants to the fat source, and by using only the highest quality fish oils. At Zeigler Bros. all fish oils are tested for rancidity and contaminants before being purchased. Storage according to the suggested guidelines will also minimize the possibility of rancidity.

MICROORGANISMS

Unfortunately, most animal feeds provide a very good growth media for molds and bacteria when sufficient moisture and warmth are present. Molds produce poisons called mycotoxins, which can cause symptoms ranging from poor growth to mortality in most aquaculture species. Maintaining low moisture levels (<10%) and using fresh, high quality ingredients make our feed less likely to mold, but the real key to mold prevention is good storage conditions.

INFESTATIONS: RODENTS/INSECTS

Any time feed is stored for a long period of time there is a chance of infestation occurring. Rodents and insects create problems by acting as vectors - agents which carry disease and mold from one area to another. Left unchecked, they can do major damage to any stored feed supply. The following storage guidelines include suggestions to help prevent infestation.



PRODUCT STORAGE INSTRUCTIONS

- Store in a cool, dry place away from sunlight
- Check packaging for manufactured dates
- Rotate stock to use oldest product first ("first in, first out" principle)
- If receiving skids of feed, remove plastic wrap to prolong life of product

*Additional information about storage guidelines can be found in our storage & handling pamphlet or visit www.zeiglerfeed.com.

Thank You!

*For your business, your ideas, your
feedback and willingness to help
Zeigler continue to improve and
advance our products.*

