Discardless Project
How Can Science Help

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Discardless – the Challenges Producing High Quality Products

- Producing a good quality food and feed
- Investing in onboard equipment for sorting and tracing
- Shoreside processing development
- LO Regulations
- What are the incentives?
  - fishermen
  - processors

What can be learned from U.S.

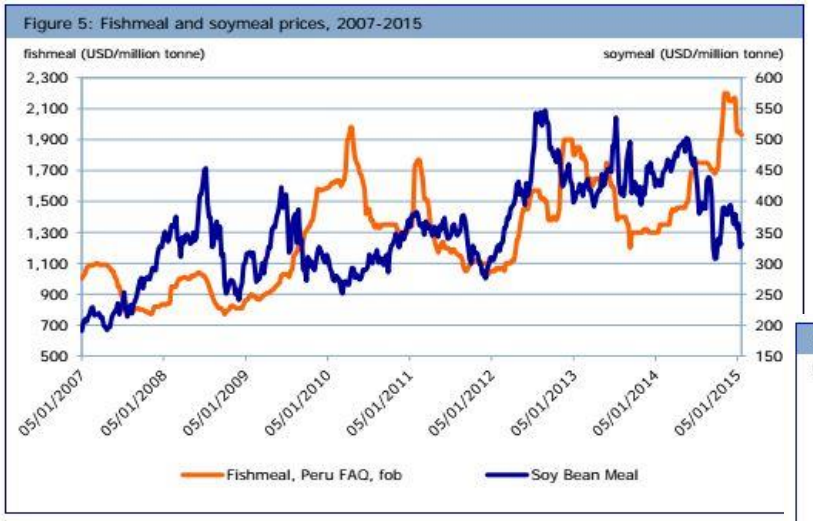
- While U.S. does not have a discard ban there is a strong effort to ↑ utilization of captured fish.
- Past 20 years utilization has increased from 40% to 70% from increase recovery of flesh to new by-product uses.
- While some incentives are from need to reduce waste disposal costs most are market-driven.
- Increase fishmeal and fish oil prices and high demand for animal feed are important drivers.

Recent Trends in U.S. to Increase By-Product Utilization

- Market driven
- Private industry
  - Pacific Seafood example
- Increase profits
- Seafood = good nutrition
- Green marketing
- Nutraceuticals
- High Demand
  - Fishmeal & fish oil
  - Pet foods
  - Fish hydrolysates

Dried fish skins - $12.95package
Dog treats – high in omega-3s

Fish Meal prices have doubled
Fish Oil prices have tripled



The Value Chain

Live Fish					Fish Feed	
Landing	By-Products					
FISH	LIVER	SPERM	ROE	STOMACH	BACKBONE	HEADS
Fresh	Canned	DNA	Biochemicals	Pepsin	Minerals	Minerals
Mince	Frozen	Protein			Gelatine	Gelatine
Dried	Omega 3 oil	Histones			Collagene	Collagene
Frozen	Lipases	Phospholipids				Lysozyme
Surimi		Enzymes				
Consumer products	Consumer products	Consumer products	Consumer products	Consumer products	Consumer products	Consumer products

Uses for Seafood By-products in U.S. Market Driven – Increase profits

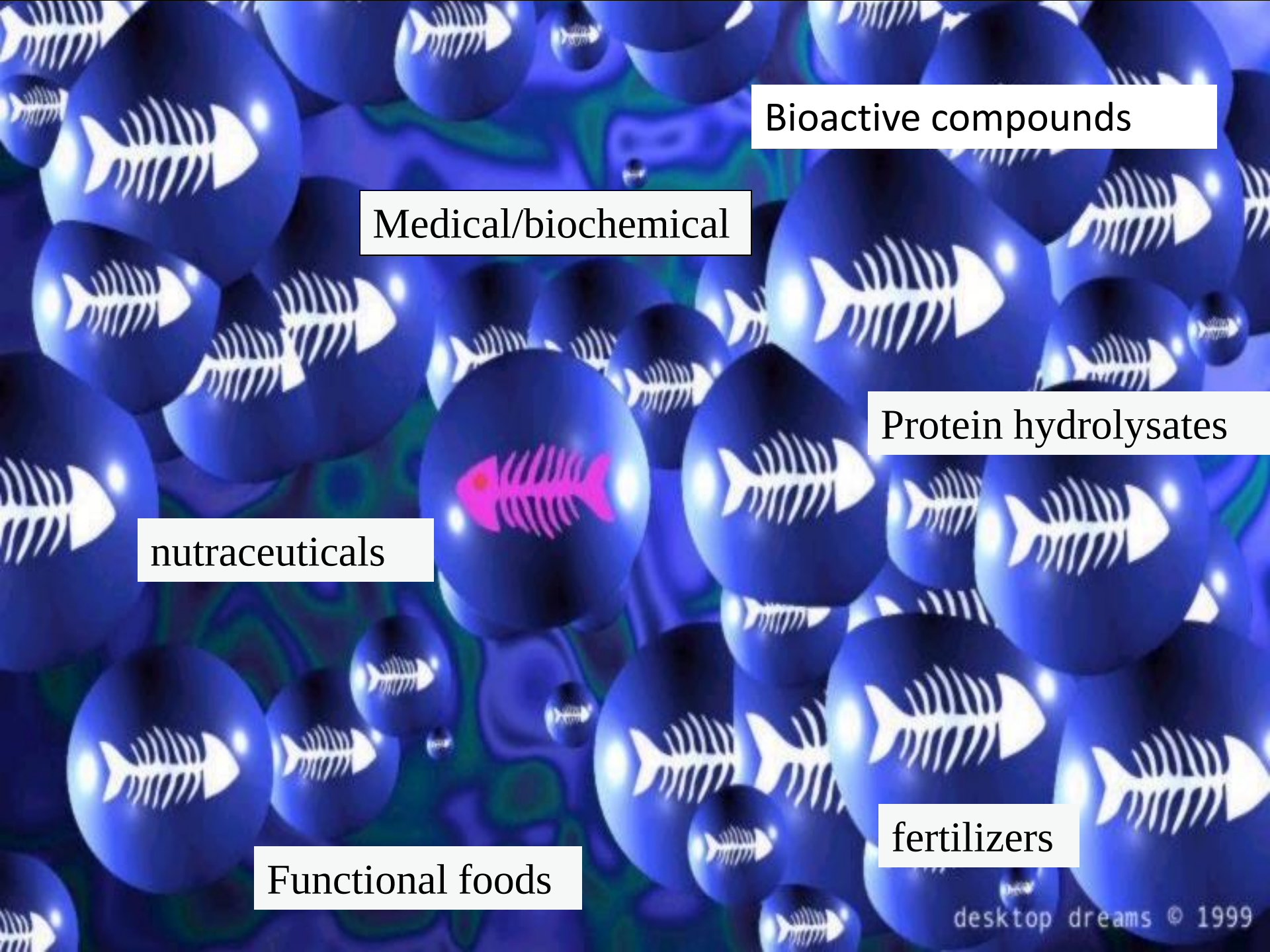
- Solid waste
  - Mince
  - Fish meal
  - Pet Foods
  - Hydrolysate
  - Fertilizers
  - Enzymes
  - Chitosan
  - Nutraceuticals
  - Specialty uses
- Liquid/water waste
  - Insoluble compounds
    - Proteins
    - Organic cmpds
  - Soluble compounds
    - Enzymes
    - Antioxidants
    - Bioactive cmpds

Marine Enzymes Used in the Seafood Industry

Problem	***Application***
Poor yield of caviar	*Enzymatic removal of connective tissue*
Skin difficult to remove from squid	*"biological knives"*
De - scaling	*Selective enzymatic removal of scales*
Herring fermentation	*Pyloric caeca from cod makes fermentation more uniform*
Fish sauce fermenta-tion takes 2 years	*Marine enzymes can accelerate process*

Thoughts from Discardless Project

- Determination of investment needed for vessel and shoreside development for handling discards.
- Difficult balance between not creating demand but having profit-driven utilization.
- What product opportunities will work best food or feed?
- Need clarity of what discards can and cannot be used for human food.
- Discards for human food or feed both need proper handling, storage and processing for high quality products
- How will crews and stakeholders be incentivized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