



HAARSLEV™
Processing Technology

FISH PROTEIN STRATEGIC INGREDIENT

What is the X factor?

Jette Lund Kristensen

Business Manager Food and Feed Ingredients

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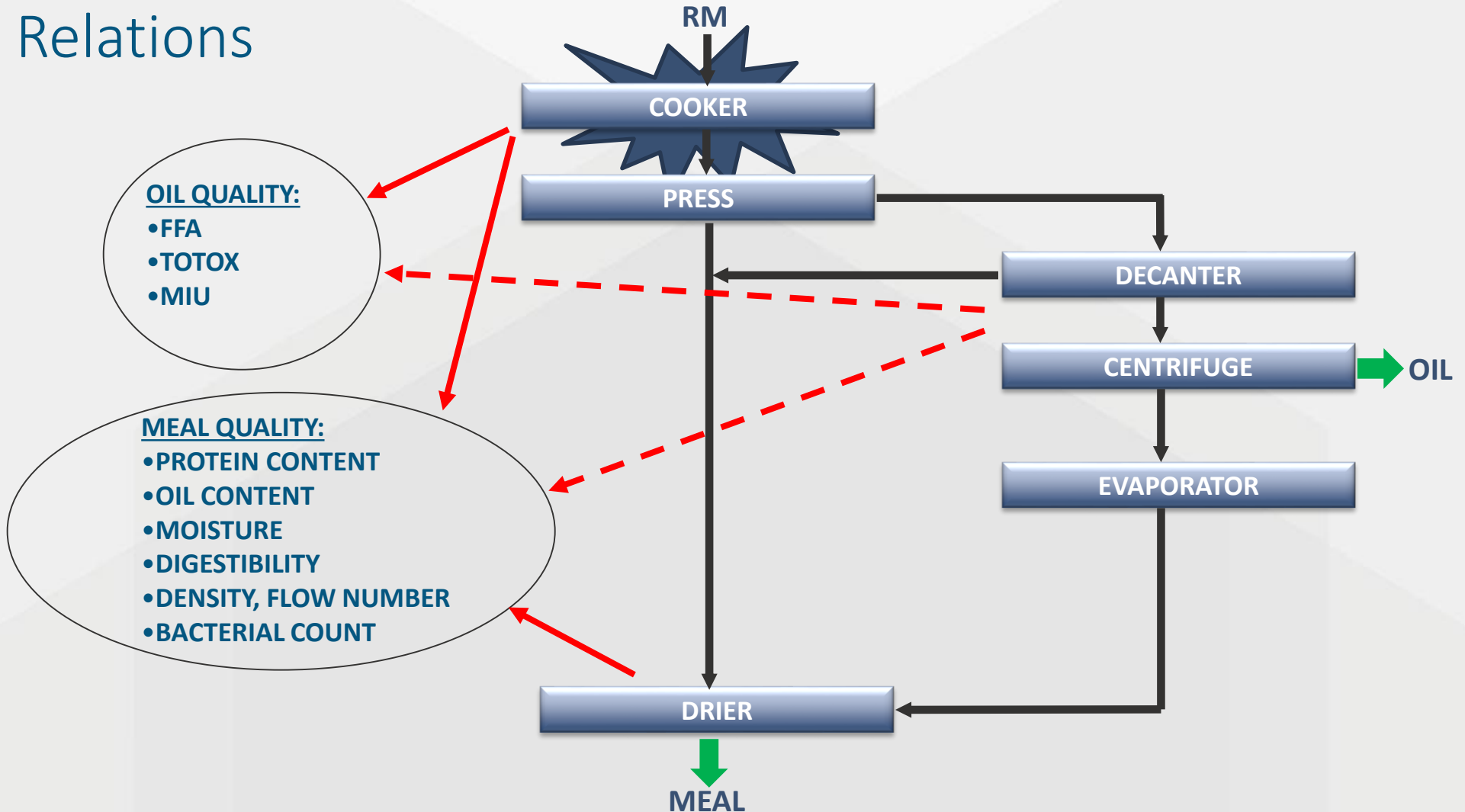
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AGENDA

STRATEGIC INGREDIENT
IMPROVEMENT IN FISHING INDUSTRY
WHAT IS A VEGETABLE PROTEIN
BENCH MARK TO VEGETABLE PROTEIN
SEGREGATION OF COMPONENTS



Quality Relations



Purpose of the Cooking Process

- ...to break membranes of the fat cells
- ...to coagulate the proteins

Quality Increasing Parameters

- Reduction of the heat load on the RM, either
 - ...by reducing the **temperature**, or
 - ...by reducing the **retention time**, or
 - ...a combination of both



Purpose of the Drying Process

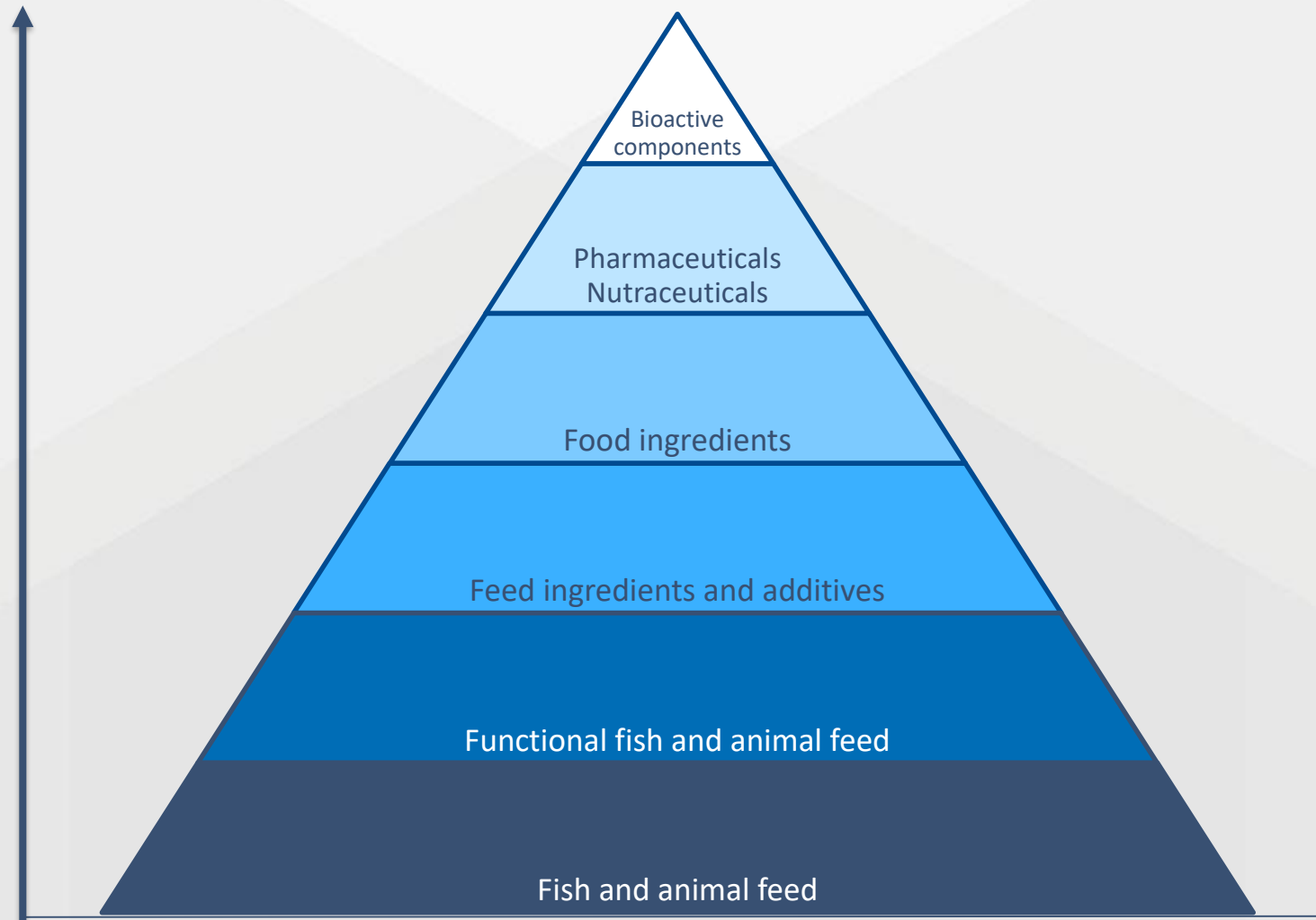
- ...to remove moisture
- ...to stabilize the proteins and oils

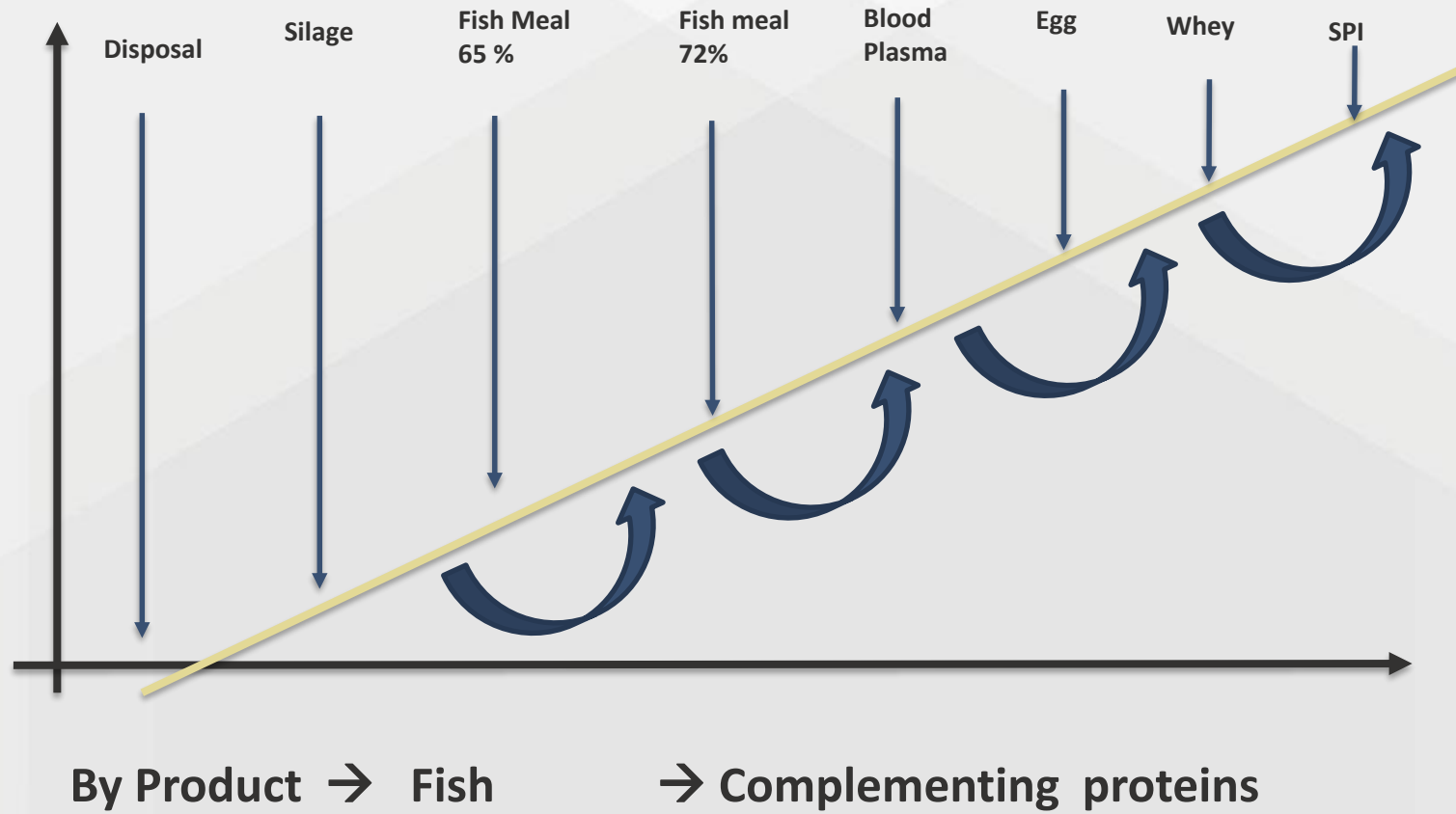


Quality Increasing Parameters

- Reduction of the heat load on the dewatered product , either
 - ...by reducing the **temperature**, or
 - ...by reducing the **retention time**, or
 - ...a combination of both







Enhancing functionality with our soy protein specific isolates

Today, customers are demanding more from food products — value, improved taste, convenience and nutritional benefits are just a few characteristics that contribute to the success of a product. To meet these demands, companies look for ways to make more affordable, nutritious products without compromising quality. A solution to these needs is soy protein — a complete, plant-based protein that offers the functional qualities needed.

As an ingredient, soy has several functions when used with food products. The versatile nature of soy both as protein allows it to deliver the following functions within foods:

Solubility

Nutrition

Emulsification

Gelation

Water binding

Whipping/foaming

Viscosity

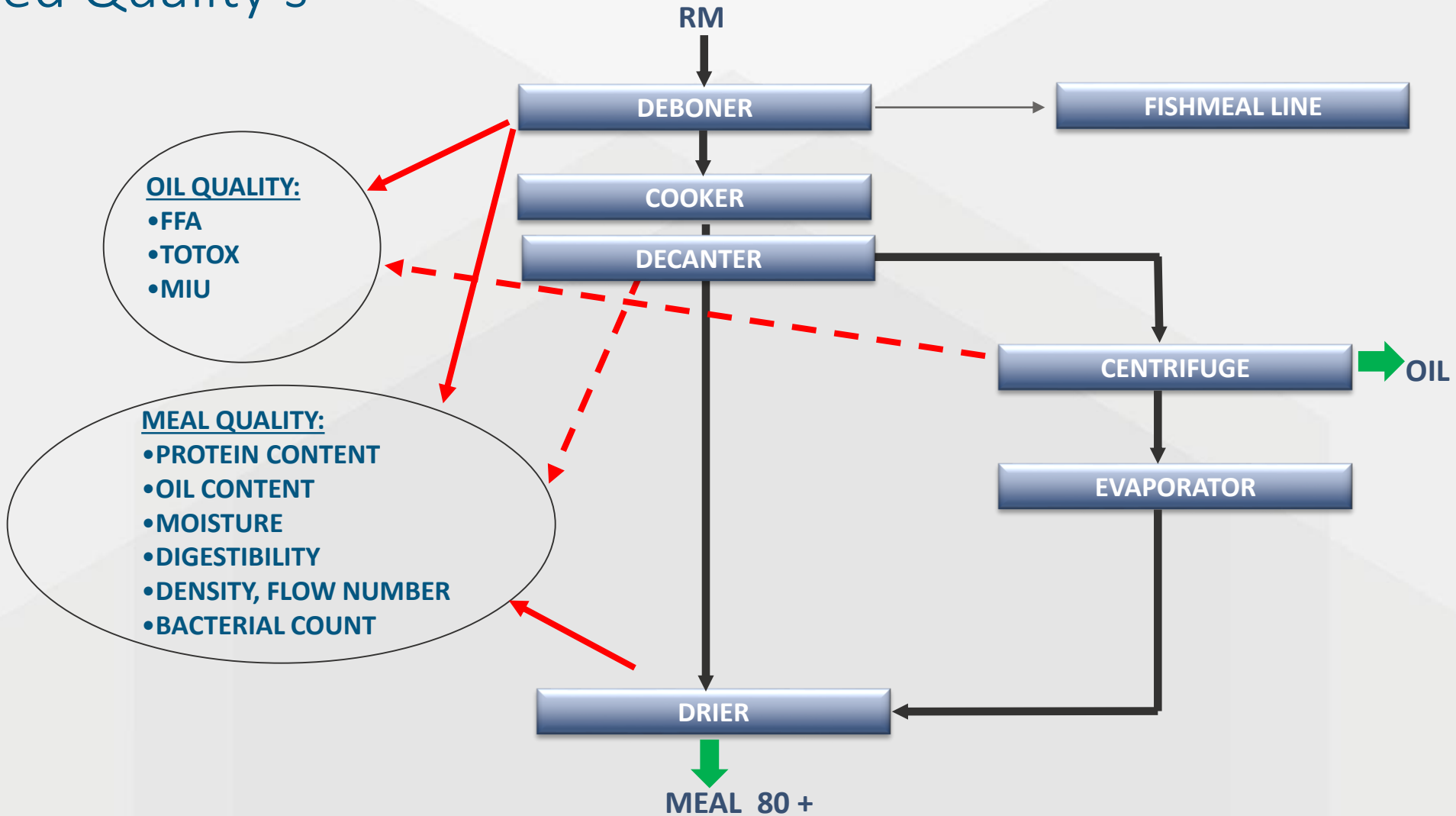
Flavor/aroma

High
% protein

Pure %
protein



Increased Quality s





Feed additives are product used in animal and fish nutrition for purposes of improving the quality of the feed and the quality of food from animal origin or to improve the animal's performance and health e.g providing enhanced digestability of the feed material

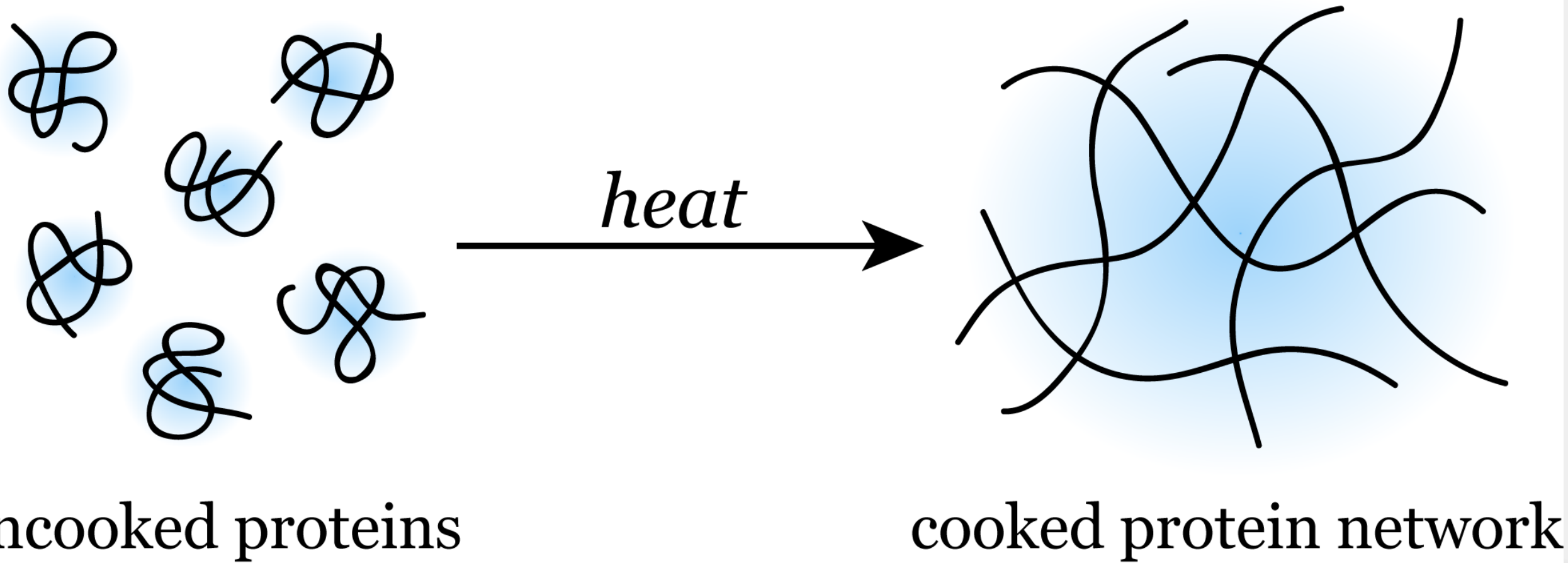


1. **Sensory Additive**- stimulation and animal appetite so they naturally eat more
2. **Nutritional Additive**- providing particular nutrient that may be deficient in an animal's diet
3. **Zootechnical Additive** -improve the overall nutritional value of an animal's diet

Function of Protein

- Approximately 13-18 % of the composition of meat is protein
- Protein cooks through the process of coagulation
- Coagulation of protein toughens their structure



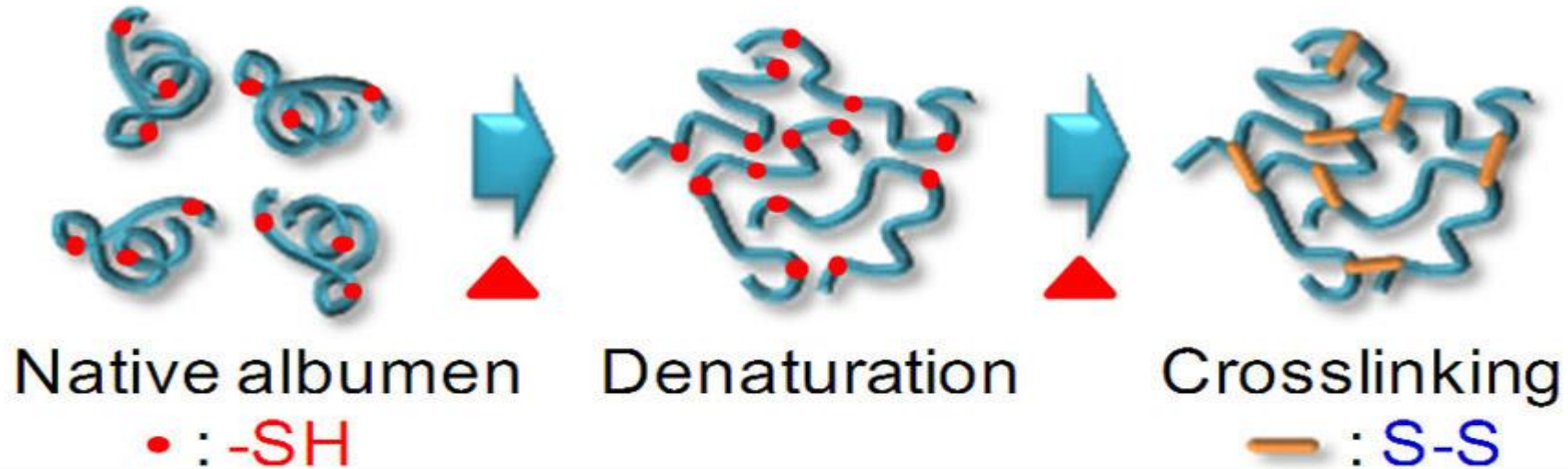


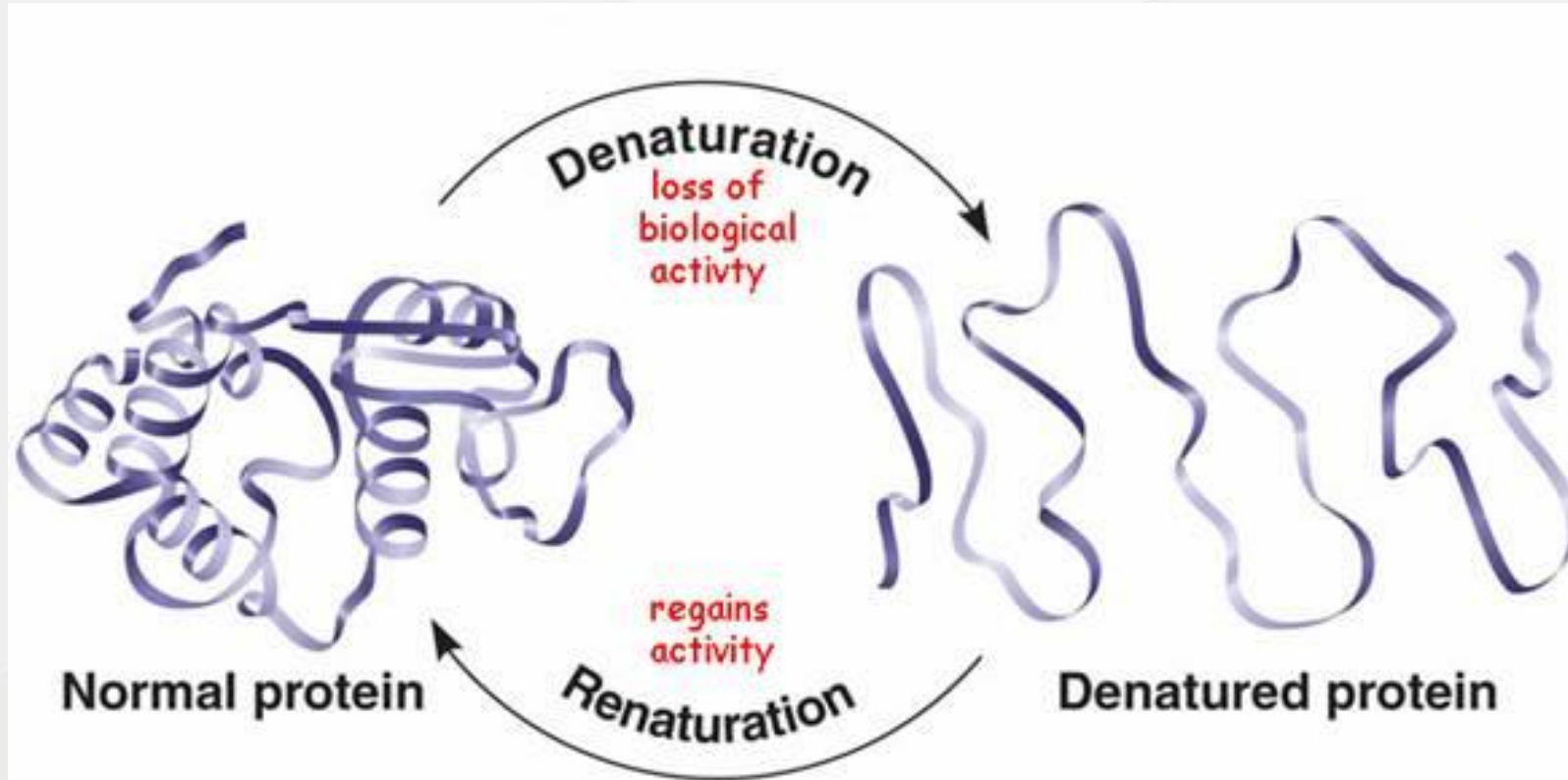
(a)




(b)

Protein Thermal Irreversible Denaturation

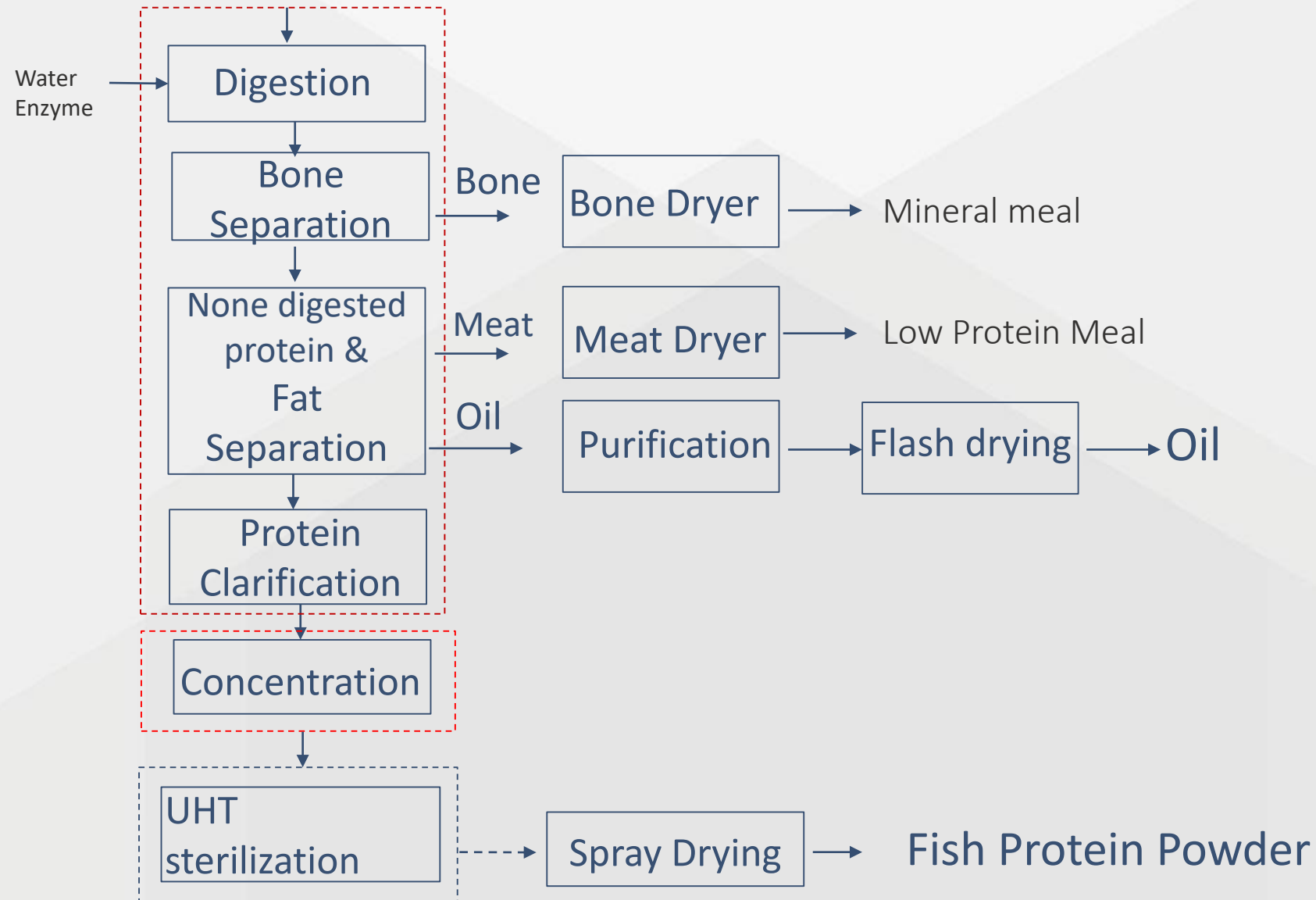




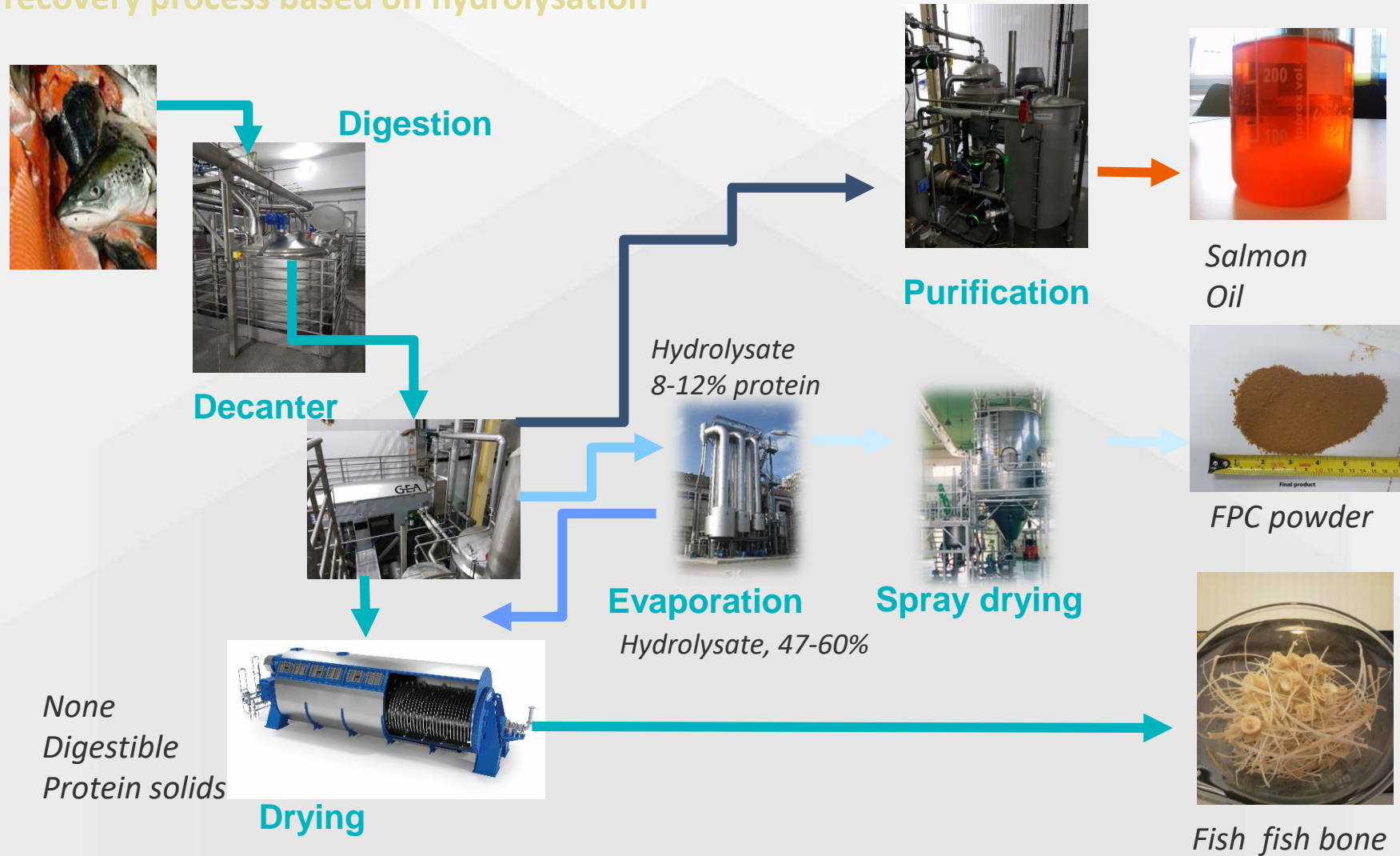


 Shows hydrophobic amino acid





- New protein recovery process based on hydrolysatation



Functional Proteins

Benefits

- High protein content
- Disperse very well in recipient
- Increase water-binding capacity
- Enhance fat-binding capacity
- Enhance health of animal
- Design special feed for certain diets



Functional Fish Protein is an alternative to vegetable proteins ?

- The X factor for the fish industry

- Process fresh raw material into feed additive ingredients with enhance
 - Functionality,
 - Palatability
 - Flavour enhancer
 - Nutritional value
- Segregation of the raw material to provided all essential amino acids, minerals phospholipids and fatty acids as a replacer to vegetable protein
- Marketing the new X factor as an additive ingredients more than a basic ingredients





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THANK YOU