



Technology Transfer Workshops on Enzyme Activity, Digestive Capacity, and *In Vitro* Digestibility

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General objective

To exchange experiences aimed at standardizing methods and forms of expression of enzymatic activity, digestive capacity, and digestibility *in vitro* in aquatic organisms.

Objectives

To develop technology transfer workshops, at the facilities of interested laboratories, on: I. Digestive enzymes and methods, II. Digestive capacity, and III. *In vitro* digestibility of dietary proteins, lipids, and carbohydrates in fish, crustaceans, and mollusks. The workshops are geared toward designing methods tailored to the species of interest, optimizing methods based on the laboratory's capabilities, and standardizing methods and formulas for expressing units of enzyme activity, digestive capacity, and *in vitro* digestibility.

Transfer Format

On-site Theoretical-Practical Workshops.

Target Audience:

Research groups, biochemical analysis laboratories, and food companies.

MODULES

MODULE I. Digestive Enzymes and Methods

MODULE II. Digestive Capacity.

MODULE III. *In vitro* digestibility of dietary proteins, lipids, and carbohydrates.

TOPICS

MODULE I.

Digestive Enzymes and Methods

- Digestive enzymes in the digestive tract
- Enzyme extracts and preservation

- Kinetic vs. endpoint methods
- Spectrophotometric and fluorogenic methods
- Catalytic reaction and hydrolysis products
- Optimization of reaction volume, enzyme:substrate ratio (E:S), and incubation time
- Determination of environmental conditions in the reaction mixture (temperature, pH, ionic strength, etc.).
- Definition of enzyme units.
- Standard curves and molar extinction coefficient (MEC).
- Spreadsheets for determining the activity of acid protease (pepsin-like), alkaline protease, chymotrypsin, trypsin, leucine aminopeptidase, amylase, lipase, acid phosphatase, and alkaline phosphatase.

Duration: 3-5 days. Theory (2 days, 4.5 h/day), Practice (1-3 days, 4 h/day, 2-3 enzymes/day).

MODULE II. Digestive Capacity

- Definition of digestive capacity
- Digestive anatomy and function
- Origin, feeding history, time of slaughter, weight, and size.
- Dissection of digestive organs
- Preparation of extracts
- Enzyme análisis
- Concepts of extract theoretical volume (*ETV*), digestive capacity (*DC*), digestive processing (*DP*), digestive processing index (*DPI*).
- Spreadsheets for determining digestive capacity.

Duration: 2-3 days. Theory (1 day, 4.5 h/day), Practice (1-2 days, 4 h/day, 2-3 digestive capacity enzymes/day).

MODULE III. *In vitro* digestibility of dietary proteins, lipids, and carbohydrates.

- Food polymers.
- Types of *in vitro* digestibility methods (pH stat, closed reactor, semipermeable membrane digestion reactor), according to the food polymer.
- Intake, digestion time.
- Design of the *in vitro* digestibility method for the species.
 - Type of food polymer.
 - Origin, feeding history, time of slaughter, weight, size.
 - Digestive organs for the enzymatic reagent.
 - Determination of environmental conditions in the digestion mixture (temperature, pH, ionic strength, etc.).
 - Determination of the E:S ratio in the digestion mixture.

- Digestion time.
- Method for quantifying *in vitro* digestibility.
- Standard molecules (Reference) for relative digestibility.
- Spreadsheets for quantifying *in vitro* digestibility.

Duration: 3-5 days. Theory (1 day, 4.5 h/day), Practice (1-4 days, 4 h/day, 1-2 digestibility methods/day)

Interested parties should contact:

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