

# Centre for Aquaculture and Seafood Development





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The Fisheries and Marine Institute of Memorial University is North America's most comprehensive marine institute dedicated to education, training, applied research, industrial response, and technology transfer in support of ocean industries.



The Centre for Aquaculture and Seafood Development (CASD) is part of the School of Fisheries and is internationally recognized for its applied scientific and technical expertise, facilities and commitment to clients. CASD offers a complete range of services for the seafood processing and aquaculture industries in the areas of applied research, product and process development, technology transfer, advisory services and industrial training. From single person owner/

operator start-up companies to large, national and international corporations, CASD can play an integral role in:

- Technical development
- Improving current practices and procedures
- Industrial training workshops
- New product development and commercialization
- Aquatic health
- Fishery by-products research
- Aquaculture research

Clients can access CASD's modern aquaculture research facility, food pilot plant, and the Atlantic Canadian fishery by-products research centre.

Clients benefit from CASD's attention to quality assurance that comes with the Marine Institute's ISO-9001™ (2000 standards) registration.

CASD provides a suite of technical capabilities and expertise for addressing industry needs and participates in research and development efforts for future growth and diversification.



Protecting our aquatic resources and maximizing their potential are the driving force for the staff at CASD's applied research units.



## Aquatic Health

CASD provides fish, shellfish and aquatic health services, combined with state of the art facilities for proactive research and product development, to promote sustainable aquaculture and fisheries.

### Services

CASD has the infrastructure and expertise to provide the following services related to fish and shellfish health:

- Bacterial, fungal and parasitic identification, including histopathology
- Aquatic ecosystem monitoring at both marine and freshwater sites
- Product testing of vaccines and immunostimulants
- Wild fish and shellfish pathogen surveys
- Research on new husbandry techniques
- Extension services to government programs
- Training of highly qualified personnel including graduate students and health technicians
- Delivery of industrial training workshops
- Advice to commercial and scientific clients on protocol development and experimental design

### Facilities

- Artesian well supplied, flow-through quarantine level I containment facility, currently housing 24 120 litre tanks
- Histology lab with image analysis capabilities
- Live food culture laboratory
- Microbiology and chemistry laboratories
  - ♦ High performance liquid chromatography (HPLC)
  - ♦ Gas chromatography – mass spectrometry (GC-MS)
  - ♦ Ion analyzer
  - ♦ Atomic absorption spectrophotometer (AA)



Our quarantine facility allows users to carry out research requiring biological containment, ensured through the application of strict operating protocols.



# Aquaculture

CASD's aquaculture facility serves three principal roles: industrial and applied research, the training of industry stakeholders, and the education and training of master of science (aquaculture) and advanced diploma in sustainable aquaculture (ADSA) students. Students and individual clients utilize the aquaculture facilities to carry out independent research projects. Protocols are developed and approved by Memorial University of Newfoundland's Animal Care Committee, in accordance with the Canadian Council of Animal Care guidelines, prior to the commencement of any research activities.

## Services

Aquaculture site evaluations, biotelemetry and nutritional studies are among the many aquaculture services offered by CASD.

### *Aquaculture site evaluations*

- ♦ Hydrographic equipment and deployment
- ♦ Field expertise
- ♦ Hydrographic evaluation and interpretation
- ♦ Spat collection

### *Biotelemetry*

- ♦ Fish behaviour in escapees (wild/domestic stock interactions)
- ♦ Feeding behaviour patterns

### *Nutritional studies, feed and feed additive evaluations*

- ♦ Production of experimental diets for marine finfish
- ♦ Experimental protocol design
- ♦ Comparative studies among species
- ♦ Feed attractant and stimulant studies

## Facilities

CASD hosts a modern aquaculture research facility which is comprised of four independent recirculating systems capable of using fresh or salt water, in addition to a flow-through freshwater quarantine facility.



All aquaculture systems are monitored with a Direct Digital Control (DDC) alarm system for critical parameters including temperature, dissolved oxygen, water levels, and water flow.



# Seafood and Food Processing

Clients can develop and process seafood or fruit and vegetable test market samples for local, national and international markets. Clients can also use CASD's facilities for developing or testing new equipment and processing technologies, or to conduct training workshops.

## Services

CASD offers a range of seafood and food processing services to industry, including:

### *Product analysis*

- ♦ Chemical analysis, microbial analysis, shelf-life studies and sensory analysis

### *New food product and process development*

- ♦ Thermal process development and validation studies
- ♦ Development of value-added secondary products
- ♦ Pilot-scale production runs and scale-up assistance
- ♦ MAP and hurdle technology

### *Equipment design and evaluation*

- ♦ Third-party independent evaluation
- ♦ Prototype development and testing

### *HACCP assistance*

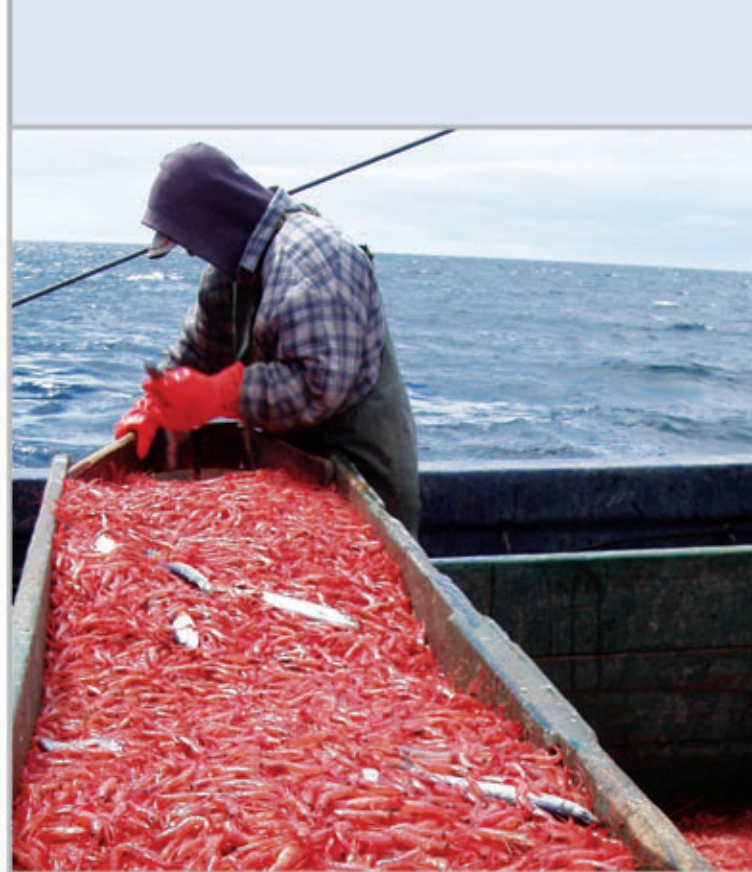
- ♦ QMP and FSEP
- ♦ Development of:
  - ♦ Prerequisite programs
  - ♦ Regulatory action point plans
  - ♦ HACCP plans
- ♦ HACCP auditing

### *Post-harvest technologies*

- ♦ On-board handling and holding
- ♦ Processing deck design and layout

## Facilities

CASD operates a provincially and federally registered 1250m<sup>2</sup> pilot plant for ready-to-eat seafood products, and processed fruit and vegetable products, as well as a non-registered food science pilot plant. The centre is equipped with a sensory evaluation lab housing six individual testing booths and has access to microbiology and food chemistry labs for analytical work.



CASD has an American Society of Quality (ASQ) Certified HACCP Auditor on staff to assist clients with the maintenance and verification requirements of the HACCP system.



## Fishery By-products

To help the fishery capitalize on the tremendous potential for product diversification and value addition, the Marine Institute has established the Atlantic Canada Fishery By-products Research Centre. This facility uses innovative research and development to encourage commercial by-product utilization.

### Services

Some of CASD's many services include:

- Conversion of fish processing discards to high value-added end products such as nutraceuticals, pigments, bioactive compounds, functional foods, flavourants and enzymes
- Laboratory scale research, pilot scale production activities, and technology transfer required for commercialization
- Application of extraction, isolation, purification and concentration techniques to develop the desired high quality products
- Development of new processes and products from processing waste streams
- Investigation of the structure and functional properties of biomolecules
- Routine analysis in areas of proximate composition, microbiology, amino acid profiles, and free fatty acids

### Facilities

This \$5.3 million project includes a new 200 m<sup>2</sup> research and development pilot plant, a range of state-of-the-art research equipment and the establishment of a formal research network involving leading scientists and engineers at Memorial, Dalhousie, St. Francis Xavier and McGill universities.



CASD is bringing together a host of Atlantic Canadian experts that will create new products and industrial processes with its new infrastructure. Our goal is to build our knowledge and put it to work for aquaculture, biotechnology, nutraceutical and food processing companies.





"As a supplier of a wide-range of pharmaceuticals for the aquaculture industry, we have frequently collaborated with CASD staff on several immunostimulant trials with various fish species, as well as an excellent study on an anesthetic. We look forward to the opportunity for further collaboration and on-going projects with the Marine Institute's Centre for Aquaculture and Seafood Development."

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