



Pacific
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QUALITY ASSURANCE IN HIGHER EDUCATION AND TRAINING IN PACIFIC ISLAND COUNTRIES AND TERRITORIES

MICRO-QUALIFICATION IN MAINTAINING SEAFOOD SAFETY AND QUALITY: UNIT STANDARDS BOOKLET

Educational Quality and Assessment Programme:
Pacific Community



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SEAFOOD SAFETY AND QUALITY:
UNIT STANDARDS BOOKLET

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The Pacific Community

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Introduction

The Educational Quality and Assessment Programme (EQAP), which is a division within the Pacific Community (SPC), is the agency responsible for measuring and monitoring quality in education in Pacific Island countries and territories (PICTs). EQAP focuses on two priority areas: facilitating labour and learner mobility, and enhancing educational quality.

One of the areas EQAP invests in to fulfil these objectives is quality assurance in post-secondary education and training. Establishing regional educational standards and benchmarks is crucial if the aspiration of PICT leaders to set up a framework is to be achieved.

As a regional quality assurance agency, EQAP has been mandated to perform the following functions listed below:

- Quality audit of quality assurance agencies.
- Accreditation of institutions and provider qualifications in countries that do not have national quality assurance agencies.
- Accreditation of regional qualifications and units of learning.
- Quality assurance of providers to deliver regional qualifications and units of learning/ micro-qualifications.
- Recognition of foreign qualifications.

This year, EQAP has also ventured into the development of micro-qualifications. A micro-qualification is a subset or component of a qualification that is designed to address a specific need where only certain skill sets are required. Micro-qualifications are created by developing and packaging the learning outcomes. Many organisations, including SPC, develop and deliver short training packages to address gaps in skills and competencies. However, most of the training packages is neither accredited nor recognised, as there are no pre-defined systems on the development and packaging of such training. The national quality assurance agencies in the region only accredit and recognise full qualifications and do not have any established mechanisms to recognise the short training packages.

With the influx of these training packages that are provided by various organisations in the region, there is a need to appropriately develop these into micro-qualifications (MQ) and have them recognised. This will add value to the certificates acquired by learners who have been trained and will enhance their employability.

For a micro-qualification to be appropriate for and relevant to the needs of the industry, the industry must be engaged in the development of standards or learning outcomes. The industry experts constitute what is generally referred to as the Industry Advisory Committee (IAC). The IAC provides professional input in the development of standards or learning outcomes that constitute a unit of learning.

This document is a compilation of the standards of the Micro-Qualification in Maintaining Seafood Safety and Quality and is called the *Unit Standards Booklet*. The title, level, credit, purpose, learning outcomes, performance criteria and other relevant details of each unit standard of the micro-qualification is outlined. The document should be used together with the *Qualifications Document* for this micro-qualification.



Unit Standard 1

Title	Outline Causes of Seafood Spoilage and Quality Control Factors				
Level	3	Credits	4	Status	
Purpose	Learners credited with this unit standard are able to outline causes of seafood spoilage and methods of reducing seafood spoilage, describe quality control factors, and describe critical control points of hazards and high-risk factors of contamination and spoilage.				
Registration Date		Planned Review Date	June 2022		
Classification	Agriculture, Environment and Related Studies > Fisheries > Seafood Post-Harvest.				
Prerequisites	It is expected that an entrant into this qualification will have basic literacy and numeracy skills.				

Special Notes

1. Definitions

- CITES – Convention on the International Trade in Endangered Species of Wild Fauna and Flora.
- HACCP – Hazard Analysis and Critical Control Points.
- RSW – Refrigerated Sea Water (ice slurry).
- Seafood includes, but is not limited to, fish species, crustaceans, seaweed, shellfish, etc.
- Bivalves include, but are not limited to, mussels, clams, cockles, scallops and razor shells.
- Crustaceans include, but are not limited to, crabs, lobsters, mantis shrimp and prawns.
- Fish includes, but is not limited to, sharks, rays, finfish, squid, cuttlefish and octopus.

2. Legislation

- Commerce Act
- Tax Act
- Trading Act
- Companies Act
- Fisheries Act
- Marine Resources Act
- Environmental Protection Act
- Provincial bylaws
- Work and safety regulations
- National instruments derived from international obligations, e.g. CITES
- Food safety regulations

- Council bylaws
- Aquaculture Act (Aquatic Resources)

3. *Health and Safety Requirements*

- Be aware of other personnel and apply personal hygiene and safety when using equipment.

4. *Resources Required for Assessment*

- Fish (fresh and old) and/or other seafood, aquatic products, seafood containers and ice.

5. *Skills and Knowledge to be Acquired*

- Bacterial contamination
- Enzyme behaviour in fish
- Storage methods and temperature control
- Correct seafood identification and labelling
- Critical control points in the cold chain
- High-risk factors of spoilage

Outcomes and Performance Criteria

Outcome 1

Outline causes of seafood spoilage and methods for reducing seafood spoilage.

Performance Criteria

1.1 Sources of bacterial contamination of seafood are outlined.

Range	Potential sources of bacterial contamination may include, but are not limited to, plant and equipment, raw materials and ingredients, people, packaging, pests (for example, rats and mongooses), water supply, condensation, wastewater, water source, reticulation system, hose and/or hose fittings, ice-making plant and equipment, ice storage facilities during transportation, type of ice (sluice, block, slurry, etc.).
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1.2 Biochemical pathway of fish spoilage and how enzymes from fish cause degradation of product are outlined.

1.3 Storage methods that reduce seafood spoilage are outlined.

Range	Storage methods may include, but are not limited to, various domestic and commercial applications/practices such as avoiding cross-contamination with other meat products in a household refrigerator or hanging fish in a commercial cold room.
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Outcome 2

Describe quality control factors.

Performance Criteria

- 2.1 Appropriate temperature control procedures for storing, transporting and displaying seafood are described.
- Range Temperature control may include, but is not limited to, using ice, chilling, freezing or refrigerating.
- 2.2 Methods of maintaining seafood quality are described.
- Range Methods may include, but are not limited to, using an appropriate cooling medium; preventing bruising, crushing and freezer burn; using rate of cooling procedures appropriate to seafood product; and using proper storage containers.
- 2.3 Labelling and packaging techniques of various seafood species are described.
- Range Labelling may include identifying species by local, common, scientific and/or correct marketing name(s). Packaging techniques may include, but are not limited to, considering the processing nature of fish, and product description as per food safety requirements/regulations, weight, etc.

Outcome 3

Describe critical control points of hazards and high-risk factors of contamination and spoilage.

Performance Criteria

- 3.1 Critical control points (CCP) of hazards are identified and described.
- Range CCP may include, but are not limited to, identifying where in the post-harvest process preventive measures are established.
- 3.2 High-risk factors in terms of spoilage or contamination are described.
- Range Factors causing contamination may include, but not limited to, seafood not stored in correct conditions or when seafood is cross-contaminated by other foods; edible seafood is contaminated by waste; seafood is moved between handling areas and comes into contact with unhygienic elements (including human beings) or unwashed, previously used equipment.

Unit Standard 2

Title	Demonstrate Basic Post-harvest Seafood Handling Skills				
Level	3	Credits	5	Status	
Purpose	Learners credited with this unit standard are able to demonstrate personal, equipment and workplace hygiene, outline the cold chain for maintaining seafood quality, and explain disposal and commercial merits of waste products.				
Registration Date		Planned Review Date	June 2022		
Classification	Agriculture, Environment and Related Studies > Fisheries > Seafood Post-Harvest.				
Prerequisites	It is expected that an entrant into this micro-qualification will have basic literacy and numeracy skills.				

Special Notes

1. Definitions

- CITES – Convention on the International Trade in Endangered Species of Wild Fauna and Flora.
- HACCP – Hazard Analysis and Critical Control Points.
- RSW – Refrigerated Sea Water (ice slurry).
- Bivalves include, but are not limited to, mussels, clams, cockles, scallops and razor shells.
- Crustaceans include, but are not limited to, crabs, lobsters, mantis shrimp and prawns.
- Fish includes, but is not limited to, sharks, rays, finfish, squid, cuttlefish and octopus.
- Processing – changing the original form of the seafood species such as filleting fish, taking heads off shrimp, shucking oysters, etc.

2. Legislation

- Commerce Act
- Tax Act
- Trading Act
- Companies Act
- Fisheries Act
- Marine Resources Act
- Environmental Protection Act
- Provincial bylaws

- Work and safety regulations
- National instruments derived from international obligations, e.g. CITES
- Food safety regulations
- Council bylaws
- Aquaculture Act (Aquatic Resources)

3. Health and Safety Requirements

- Be aware of others individuals and apply personal hygiene and safety when using equipment.

4. Resources Required for Assessment

- A work table to clean seafood, cutting boards, knives, clean water, bin or bucket and ice.

5. Skills and Knowledge to be Acquired

- Personal, equipment and workplace hygiene
- Cold chain throughout the supply chain
- Waste disposal methods
- Commercial merits of value-added by-products

Outcomes and Performance Criteria

Outcome 1

Demonstrate personal, equipment and workplace hygiene.

Performance Criteria

1.1 Personal hygiene is demonstrated at all times.

Range Personal hygiene may include, but is not limited to, washing hands, covering any wounds, staying away from seafood products (especially if sick), not smoking or chewing betel nut around seafood products and cleaning areas, and using appropriate protective gear such as hair nets, gloves, gumboots or lab coats when processing seafood.

1.2 Equipment is cleaned with appropriate ingredients to avoid cross-contamination.

Range Cleaning ingredients may include food grade detergent and clean water. Equipment may include, but is not limited to, protective gear, boats, vehicles used to transport seafood, containers, bins or eskies, knives, cutting boards or any other utensils.

1.3 Surrounding areas including workplaces/stations are clean.

Range Cleaning may include, but is not limited to, keeping animals and insects away, keeping garbage well away from seafood and proximity of fish handling locations to conveniences (lavatories/toilets).

Outcome 2

Outline the cold chain to maintain seafood quality.

Performance Criteria

2.1 The cold chain throughout the supply chain is outlined.

Range Supply chain may include, but is not limited to, seafood harvest, storage, unloading at wharf/jetty/beach, transporting to vendors/markets, displaying at markets, distributing and selling to customers.

2.2 Critical points in the cold chain are identified using the temperature profiles.

Range Critical points may include, but are not limited to, the harvest method, transport from harvest to processor/market and storage until consumed.

Outcome 3

Explain disposal and commercial merits of waste products.

Performance Criteria

3.1 Location of waste disposal sites is identified.

Range Location may include, but is not limited to, waste holding and disposal areas being established away from cleaning/processing areas and not exposed to threat from rainwater runoff.

3.2 Disposal methods are explained.

Range Methods may include, but are not limited to, waste that needs to be transported should be taken to a proper dump or government authorised waste management site. Any water used for washing floors should exit through a drain, recycled waste (e.g. frames left over from fillets) should be separated, and waste to be burned should be disposed of in an incinerator.

3.3 Value-added by-products from waste are identified.

Range Value-added by-products may include, but are not limited to, initiatives such as leather from fish skin or jewellery from scales or shells, as well as livestock feed or fish feed.

Unit Standard 3

Title	Apply Inspection Techniques and Guidelines to Maintain Seafood Quality			
Level	3	Credits	4	Status
Purpose	Learners credited with this unit standard are able to determine seafood freshness through sensory inspection, apply methods to retain freshness or extend shelf-life and develop best practice guidelines of seafood safety and quality standards.			
Registration Date		Planned Review Date	June 2022	
Classification	Agriculture, Environment and Related Studies > Fisheries > Seafood Post-Harvest.			
Prerequisites	It is expected that an entrant into this micro-qualification will have basic literacy and numeracy skills or be engaged in a small seafood business.			

Special Notes

1. Definitions

- CITES – Convention on the International Trade in Endangered Species of Wild Fauna and Flora.
- HACCP – Hazard Analysis and Critical Control Points.
- RSW – Refrigerated Sea Water.
- Bivalves include, but are not limited to, mussels, clams, cockles, scallops, and razor shells.
- Crustaceans include, but are not limited to, crabs, lobsters, mantis shrimp and prawns.
- Fish includes, but is not limited to, sharks, rays, finfish, squid, cuttlefish and octopus.

2. Legislation

- Commerce Act
- Tax Act
- Trading Act
- Companies Act
- Fisheries Act
- Marine Resources Act
- Environmental Protection Act
- Provincial bylaws
- Work and safety regulations
- National instruments derived from international obligations, e.g. CITES
- Food safety regulations
- Council bylaws
- Aquaculture Act (Aquatic Resources)

3. Health and Safety Requirements

- Be aware of others individuals and apply personal hygiene and safety when using equipment.

4. Resources Required for Assessment

- Fish (fresh and old) and/or other seafood, aquatic products, seafood containers and ice.

5. Skills and Knowledge to be Acquired

- Spoilage pattern and common seafood defects, diseases and parasites for common species
- Handling seafood and other aquatic products to prevent damage, spoilage and waste
- Storing seafood and aquatic products in appropriate areas at correct temperatures
- Preserving seafood and aquatic products to extend shelf-life
- Maintaining nutritional value of seafood and other aquatic products
- Basic concepts of HACCP-based seafood safety

Outcomes and Performance Criteria

Outcome 1

Determine seafood freshness through sensory inspection.

Performance Criteria

- 1.1 Seafood freshness is determined and outlined through sensory inspection and alternative methods.

Range Sensory inspection includes, but is not limited to, checking that bivalves are closed, crustaceans are alive, tilapia are alive, seaweed is not wilted, fish have clear and jelly-like eyes and red gills, fresh *sea-like* smell, and flesh of fish is firm to the touch and does not remain indented, sharp bright colour (not dull or faded).

Alternative methods to sensory inspection include, but are not limited to, histamine test for pelagic species like tuna or tracking time, as well as distance and cooling factors.

Outcome 2

Apply appropriate methods to retain freshness or extend shelf-life of harvested catch.

Performance Criteria

2.1 Techniques of reducing temperature of harvested catch are outlined.

Range Techniques of reducing temperature may include, but are not limited to, using ice, slurry or RSW to preserve seafood or in the absence of ice, using a bucket with a wet cloth cover and shading catch from the sun or taking shorter fishing trips.

2.2 Proper techniques of icing, refrigerating or freezing of the catch are applied.

2.3 Post-harvest preservation techniques to prevent spoilage and extend shelf-life are applied.

Range Preservation techniques may include, but are not limited to, curing, canning, pickling, salting and smoking, adding sugar, packaging, and using nitrates or a combination of preservation methods.

Outcome 3

Develop best practice guidelines of seafood safety and quality standards.

Performance Criteria

3.1 Good manufacturing practices (GMP – aimed at the workplace) or good handling practices (GHP – aimed at workers) are explained.

Range GMP or GHP may include, but are not limited to, exportation of seafood products or application of seafood safety legislation as well as hygiene practices.

3.2 Best practice guidelines are developed in simulated exercises or in the workplace.

3.3 Accreditation standards for export are outlined.

Range Accreditation standards may include, but are not limited to, Pacific Rim country requirements for importing fresh seafood or relevant ISO 9000 for international trade of seafood using safety and storage criteria, which are implemented where applicable.

