Harmonizing Quality and Traceability Standards for Pecten trade in Asia Pacific Region

Fisheries Working Group

04/2008 project

JULY 2009

APEC
Asia-Pacific Economic Cooperation

PERU | Ministry of Production

A. Guidelines to harmonize quality and traceability standards in the *Pectinidae* trade in Asia Pacific Region

B. Requirements for the *Pectinidae* ("Scallops") Species Trade in the Asia Pacific Region

C. Commercial Importance of *Pectenidae* Characterization within Asia Pacific Region

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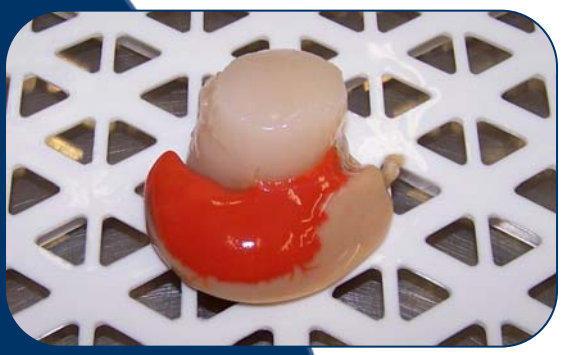

Asia-Pacific
Economic Cooperation

FWG 04/2008

SUMMARY REPORT

Purpose: Information

Submitted by: Mr. Carlos Alegre Salazar and
The Aquaculture General Directorate of Peru

Harmonizing Quality and Traceability Standards for
Pecten trade in Asia Pacific Region
FWG 04/2008 project

April, 2009

SUMMARY REPORT

FGW 04/2008 Project

"HARMONIZING QUALITY AND TRACEABILITY STANDARDS FOR PECTEN TRADE IN THE ASIA-PACIFIC REGION"

The project was approved under the Fisheries Working Group and APEC Secretariat. It was proposed by Peru and the Cosponsors were Canada and the People's Republic of China.

The project proposed to create mechanisms that allowed characterizing the quality of Pectens which are commercialized in the Pacific river basin, in order to promote aquaculture best practices and the preservation of natural zones of aquaculture production. Currently, the market is focused on *Pectinidae* codes of production and health; however, it does not distinguish quality parameters, such as genetic management, antibiotics use, phenotypic characteristics, etc.

It also suggested developing a database of *Pectinidae*, to make a regional diagnosis and to exchange information within member economies.

In March 2008, a survey was circulated about *Pectinidae* traceability and questions were made about how the economies are related to the subject. The deadline for delivery was July 2008.

Subsequently, a national consultant was hired to support the project overseer identifying international experts (5); prepare schedules of work, among others.

APEC economies were divided in four areas, and each expert was assigned an area: Zone 1: Peru, Canada, Chile, Mexico and United States, Zone 2: New Zealand, Papua New Guinea, Indonesia and Singapore, Zone 3: People's Republic of China, Japan, Korea, Hong Kong China, Chinese Taipei and Russia.

It was also added a fifth zone: European Union, for its importance on *Pecten* market. Five economies were selected: France, Spain, Italy, England, Germany and Belgium.

The experts made a research in all the economies of their zones.

In September 2008, a meeting was made with the participation of the consultants and some representative of the private sector. As a result of the meeting, the issues that should include the investigation of the experts were identified: resources, water, farming systems, harvest methods, processing, consumption, marketing, standards and regulations, among others.

With these requirements, the experts began their investigation, asking for cooperation to all economies in coordinating with the project overseer.

In December of 2008, a workshop was made in which the experts presented a summary of their research main outcomes. The workshop was attended by consultants on Pectinids, (Mr. Eduardo Uribe, Mr. Wilfredo Yap, M.Sc. Tharlochan Singh, Mr. Alejandro Salgueiro,

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Mr. Guofan Zhang and Mr. Alejandro Alonso) as well as representatives of both public and private entities.

The official opening was made by Mr. Luis Quesada, SOM PERU, which mentioned that after a successful APEC 2008, was an honor for Peru to welcome the international and national consultant again to hold this last Workshop of the year on "Harmonizing Quality and Traceability Standards for Pecten Trade"

Mr. Carlos Cisneros on behalf of the Ministry of Production of Peru mentioned that the economic importance shown by Pecten international trade in the last few years and the large production from natural sources and from aquaculture stimulated the interest to carry out the Project called "Harmonizing quality and traceability standards for Pecten trade in the Asia-Pacific Region".

Also was mentioned that the workshop complements the one carried out in September 2008 and will offer the necessary information on traceability and the quality of Pecten to guarantee the health of consumers based on the best scientific information.

The consultants made a presentation on Pecten production in each of APEC economies, as well as in the European Union, dealing with some aspects related to the resource, water monitoring, aquaculture, processing, products obtained and current regulations.

The following aspects were pointed out:

Zone 1: Canada, USA, Mexico, Peru and Chile
The economies with the largest productions in the past few years were Peru and Chile, where the most representative genera *Argopecten* and *Chlamys,* which are traded in different presentations: IQF and half valve adductor muscle and adductor muscle with Roe On, there are quality controls for its trade.

Zone 2: New Zealand, Australia, Papua New Guinea, Indonesia and Singapore
The economies with the largest productions are Australia and New Zealand. These productions come mainly from natural banks due to the annual variation of recruitment. The importance of increasing efforts to diversify production and of the cooperation among the economies to harmonize sanitary standards and enhance capabilities was also pointed out.

Zone 3: People's Republic of China, Japan, Korea, Chinese-Taipei, Hong Kong-China and Russia
Pecten biodiversity is abundant in the area, mainly in China and Japan (120 species). However, there are four species with commercial importance which come from natural beds and aquaculture. The main *Pecten* producing economies are China (aquaculture) and Japan (aquaculture and natural production).
There are sanitary controls and no additives are used in processing them.

Zone 4: Viet Nam, Brunei Darussalam, Thailand, Malaysia, Philippines
There are five species with a commercial value. However, Pecten production is not a priority for the economies in the area. Productions are low and they basically come from natural beds. Aquaculture is at an initial stage in Viet Nam.

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It is necessary to enhance research, including culture of local species. It is necessary to enhance capabilities and standardize the size of the product.

Zone 5 (France, Spain, Italy, England, Germany and Belgium)
The market of the economies in the zone requires several presentations of the product: whole, half valve and (abductor muscle with gonad), Roe On, as well as alive, fresh or frozen (preferably IQF).

Several presentations were made related to the characterization of Pecten with commercial importance, as well as to current legislation regarding international trade of Pectens among APEC economies.

Additionally, the importance for APEC economies of development *Pectens* new products were mentioned, with added value, as well as the search for new markets in order to face the situation produced by the abundance of *Pectens*.

The document with the proposed guidelines for harmonizing quality and traceability standards for Pecten trade in the Asian-Pacific Region was presented. International consultants and the participants in the workshop offered their comments and contributions, which will be incorporated into the proposal.

Mr. Jorge Zuzunaga Zuzunaga, Project Overseer, conducted the closing ceremony. He stressed the importance of this event, thanking APEC for sponsoring the project, as well as the consultants and participants for their dedicated involvement, and the organizers and the technical staff for their support that made it possible to carry out the workshop.

OUTCOMES

After the research, three documents have been done:

1. Guidelines to Harmonization Quality and Traceability Standards in the *Pectinidae* Trade In Asia-Pacific Region;
2. Requirements for the *Pectinidae* (“Scallops”)Species Trade in the Asia Pacific Region, and,
3. Commercial Importance *Pectinidae* Characterization within Asia Pacific Region.

This year, the documents have been circulated within FWG, comments and suggestions were asked.

The printing of the three documents have not made yet.

Prepared by: Mr. Carlos Alegre Salazar and the Aquaculture General Directorate of Peru

Asia-Pacific
Economic Cooperation

GUIDELINES
TO HARMONIZE QUALITY AND TRACEABILITY STANDARDS IN THE *PECTINIDAE* TRADE IN ASIA-PACIFIC REGION

Harmonizing Quality and Traceability Standards for Pecten trade in Asia Pacific Region
FWG 04/2008 project
Proposed by PERU

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1. INTRODUCTION

1.1. About APEC

Asia –Pacific Economic Cooperation or APEC is the forum for facilitating economic growth, cooperation, trade and investment in the Asia Pacific Region.

APEC is the only inter- governmental grouping in the world operating on the basis of non-binding commitments, open dialogue and equal respect for the views of all participants, unlike WTO (World Trade Organization) or other multilateral trade bodies, APEC has no treaty obligations required of its participants. Decisions made within APEC are reached by consensus and commitments are undertaking on a voluntary basis.

APEC has 21 members or "economies" which account for approximately 40.5% of the world population, approximately 54.2% of the GDP (World Domestic Product) and about 43,7% of the World Trade [1].

Since its inception, APEC has worked particularly to reduce tariffs and other trade barriers. Free and open trade and investment help economies to grow, creates jobs and provides greater opportunities for the international trade. In contrast protectionism keeps prices high and foster inefficiencies in certain industries.

1.2 Fisheries and APEC

Fisheries industries in APEC economies account for over 75 percent of the world's capture fisheries and over 90 percent of global aquaculture production. APEC economies are an important voice internationally on fishery-related issues and collectively have a significant impact on global sustainability of fisheries and responsible practices in the fish trade.

[1] APEC information 2008

For many APEC economies, fisheries are an integral component to socio-economic, and in some cases, nutritional well-being. Sustainable fisheries and aquaculture production are an important element of sound environmental conservation and resource management in the Asia-Pacific region, and are crucial for food security, poverty alleviation and economic growth.

Peru is scheduled to host the 3rd APEC Ocean-related Ministerial Meeting (AOMM3) in 2010. In preparation for this Ministerial Meeting, the Fisheries Working Group, FWG of APEC, will devote substantial attention in 2009 to those areas that will benefit most from Ministerial support and direction.

The present Guide under the Project FWG 04/2008 of the APEC Fisheries Working Group (FWG) is devoted to the trade shellfish mollusks species of the *Pectinidae* Family, bivalves practically presented in all marine environments of the Asia-Pacific economies and exploited both at industrial level as well by small scale fisheries. The central theme refers to promoting general policies in order to accomplish the food safety requirements of the most important markets of the world as a very important strategic option to get better prices for the products particularly when these are applied to improve the small scale fishery or aquaculture activity.

The development of this Guide was possible with the support of the representatives of Canada and China, co-sponsors of the Project.

1.3 The exploitation of *Pectinidae* species in the Region

According to a recent study (Caro, S. INFOPESCA, July 2008), the global trade of *Pectinidae* in 2006 reached 107 391 tons with a total

value of USD 957.9 million and a unitary value of USD 8.92/kg. This was an increase of 50% from the international trade volume of 1996. Scallops products unitary value represents the third highest in the international sea food trade behind lobsters and same kind of eel (Yap, W. 2008).

There is much diversity of the species distributed in the Asia-Pacific region ranging from the polar zones up to the equatorial zones. This includes several *genera* such as *Argopecten, Clamys, Amusium*, *Pecten, Patinopecten*, and so on. Some species have been successfully transplanted from one region to another, such as the Atlantic Bay Scallop (A*rgopecten irradians*), that are now widely used in aquaculture in China.

Pectinidae production from fishing activities occurs in natural beds using a wide range of technologies and business organizations. Current production uses ships to process and freeze high-quality products on board, ready for market, using dredges or specialized trawl nets. Others collect and shuck bivalves on board which are then packed in small sacks and kept on ice until the product is unloaded and transferred to processing plants. Small scale fisheries harvest *Pectinidae* by diving or using small hand dredges or rakes. Often incidental catch or bycatch occurs in trawl fishing without any regard for the conservation of the species. Much of the incidental or by-caught product are shucked onshore in poor hygienic conditions and sold locally in small quantities or to processors

In the last twenty to thirty years *Pectinidae* species have been successfully cultured in many regions, both from the technical and financial point of view. The culturing process requires minimal effort as the species filter the phytoplankton already present in the water and do not require any additional food. The most appropriate zones for this

activity are those with high primary productivity. Success in producing seeds artificially in hatcheries instead of collecting natural spats from the sea has increased the advantage of aquaculture for same species.

However, production and trade intended for the international market, particularly mollusks harvested from exploited wild stock, are subject to relatively complex and expensive sanitary controls. Such requirements represent serious barriers for entry and participation in the international market for small enterprises and all stakeholders involved in the extraction activities

For the government sectors that are responsible for the implementation of fishery programs, the issues also represent complex matters that require adequate financial resources to support specific control measures. This includes specialized support from laboratories equipped with expensive instruments and highly qualified personnel in addition to support from the government and participation from industry and stakeholders.
For the small extraction activity where the *Pectinidae* is a product of incidental by-catch, the situation is also critical as it is difficult to justify, economically, a sanitary program that can comply with the requirements of the international market when the activity does not have the volume to support it. There represents a high economic cost in the approval and classification of extraction areas, surveillance and control of these activities, monitoring through continuous sampling and analyses of mollusks and water from areas under exploitation through participation of specialized laboratories including the need for reference and verification. In addition, the technical capacity to perform these measures is not always available.

1.4 The Sanitary Programs and Authorities for the control of Mollusks Bivalves

This analysis indicates that the participation of a specific Authority is fundamentally important. As well, the Authority should be adequately supported by economic resources, personnel, laboratories and equipment which will help justify the cost of harvest activities subject to this level of conditions. Additionally, the analysis must be able to meet the basic requirements of hygiene and good health practices and must be organized so as to comply with any traceability demands which require that the origin of harvest and other regulatory requisites be shown at any time. This is a complex issue even if the required records may be relatively basic in nature.

Based upon the foregoing considerations, the required sanitary programs for all bivalve mollusks, including *Pectinidae*, by a Sanitary Authority requires the joint participation of competent Authorities in the fishing, environment, central and local structures, scientific and academic entities and private or external laboratories in an effort to use all potential existing capacities in the area of the exploitation of mollusks. The programs must be supported by sanitary rules and regulations developed to guarantee the wholesomeness of the mollusks.

Harmonization of sanitary rules and the application of procedures for traceability will not be enough to consistently meet the demands of food safety that markets of the developed countries require. An all-encompassing approach is required in all stages of the production process with the efficient participation of a Sanitary Authority within an integral quality assurance system and the committed participation of the operators of various enterprises.

The purpose of this guide is to identify all the factors that could constitute the quality assurance system applied to *Pectinidae* and

bivalve mollusks, as well as shellfish in general. These are comprised of the sanitary rules or standards, application procedures, traceability stipulations, the Sanitary Authority's organizational structure and support systems, such as laboratories, certification systems, surveillance and monitoring systems. To be competitive in the international market, standards and limits on microbiological levels and concentrations of chemical or toxic substances are no less important.

1.5 Thanks by Project Overseer

On behalf of Peru, I would like to state Peru's gratitude to the APEC organization for allowing the development of the FWG 04/2008 project.

I would also like to express our gratitude to the APEC Secretariat and co-sponsoring economy's support.

And finally thank you very much to all the people who contributed and assisted with the information for this document; Paola Cavero, Carlos Cisneros, Nena Gonzales, Carlos Alegre, Wilfredo Yap, Tarlochan Singh, Eduardo Uribe, Alejandro Alonso, Guofan Zhang, Huayong Que, Baozhong Liu, and Kalen Su.

2. SANITARY CONTROL PROGRAMS FOR BIVALVE MOLLUSCAN SHELLFISH

2.1 INTRODUCTION

Bivalve mollusks, including *Pectinidae*, are commonly consumed in a raw state, without cooking or under a very light thermal treatment. This type of consumption requires specific quality assurance programs in addition to the requirements of other general food safety assurance programs.

The oldest such program, which has been in force for nearly 85 years, is the United States of America (U.S.A.) National Shellfish Sanitation Program (NSSP). This program consists of a series of provisions that were updated several times and have evolved into what is now known as the "Guide for the Control of Mollusks Shellfish" (2003), which outlines specific requirements that must be adhered to. The Guide only covers molluscan shellfish, which include various species of oysters, clams, mussels and scallops (the *Pectinidae* Family).

This Guide is used as a model for the application of sanitary programs in other parts of the world, using applicable sections according to the particular conditions and control organizations that each country has. The criteria which are used for a risk assessment leading to the formulation of an effective sanitary control program are most important. These control criteria are based on sanitary studies necessary for the classification of growing areas, procedures and surveillance activities. Many other aspects related to the aquatic environment, including laboratory methods, procedures, technical and statistical approaches are included in the Guide.

The European Union, for its part, approved at the beginning of this century, specific sanitary standards for bivalve mollusks and procedures as part of the official control of food from animal origin. These standards were established under a general regulatory directive to harmonize the food regulations of all participants in the European Community (Regulation (CE) Nº 178/2002)

Under this approach each country should establish sanitary programs for bivalves mollusks based on these general regulations. However, the programs of control do not necessarily follow the same elements that may include the participation of the official health Authorities, agencies from other sectors, private entities and stakeholders who participate directly in the business, all under the leadership of a competent Authority. The basic concept is to obtain an equivalent level of control between all.

2.2 CHARACTERISTICS OF THE PROGRAMS

These programs are based on the sanitary conditions of the sea environment where bivalve shellfish are grown or cultivated despite the fact that the sanitary quality of these bivalves merely reflects the quality of the sea environment. The level of enteric-origin microorganisms (bacteria or virus) from human or animal pollution defines the sanitary classification of the aquatic environment. This is a condition that is considered predictable provided that a specific, detailed sanitary study supports the qualification and that the classification is validated by the results of a continuous monitoring procedure.

Whether the sanitary qualification of an area is approved or prohibited is decided by the competent Authority based on the results of the sanitary study conducted. The approved classification may be revoked due to increased pollution levels higher than the maximum permissible levels

already established. In those cases, corrective measures will be applied, for example the application of treatment procedures, until the pollution levels have been reduced below the limits permitted for human consumption. Other hazardous agents, either natural or man-made, may also be present in the sea environment. The presence of these hazardous agents as well as their impacts on bivalve mollusks shellfish are predictable based upon results of previous studies. Such cases include the presence of heavy metals and chemical waste from industrial origin or human activity of any kind However, there are other hazardous agents or factors whose presence in the water can be found but are not easily predictable nor in the space (exact geographic localization) nor in the time (length of the period or number of days) and when it will happen. These hazards can only be detected through the use of monitoring and analytic control procedures of the shellfish from specific areas supported on a previous Qualitative Risk Assessment based on process[2]. This is the case of plankton biotoxins (red tide) or the presence of *Vibrio vulnificus* en bivalves mollusks.

Ideally, the control and monitoring activities aimed at observing the current behavior of the sea environment conditions, such as verification and surveillance procedures, should be permanently applied by the competent Authority during the exploitation periods in the production areas. The effectiveness of these programs depends to a large extent on different elements and instruments that constitute it; among them:

- The effective management of the competent Sanitary Authority, either centrally or locally as well as horizontally when dealing with general control instances.

[2] Huss, H.H., Reilly, A., & Ben Embarek, P.K. 2000.Prevention and control of hazards in seafoods. Food Control, 11: 149-156.

- The informed and committed participation by all parties who are involved in the exploitation of bivalve mollusks (gatherer or aquatic producers, truckers, processors, handlers, sellers) and;
- The efficient support of other participants in the program, such as laboratories, that provide timely and reliable information for the effective management of bivalve shellfish activities.

It is important to mention the responsibility that the Sanitary Authority has in classifying exploitation zones, whether natural beds or aquaculture, as it may affect, to some extent, the sanitary safety of mollusks shellfish obtained from these zones. This is true despite the legal responsibility of the business operator concerning due diligence and product safety, ensuring that they have taken all the necessary actions to avoid compromising the safety of their product.

An entirely supported program must include the participation of the sanitary control program personnel along with representatives of other institutions related to fishing, environment, customs, agriculture, foreign affairs and international trade. The coordination among local Authorities and participants in the exploitation of bivalve mollusks shellfish represents a very important part of the quality assurance programs. The main objectives of the sanitary control program of bivalve mollusks can be summarized as follows:

1. To have appropriate statutory provisions for bivalve mollusks, which reflect the needs and concerns of the consumers as well the needs of the industry regarding product safety, quality and traceability.
2. To have appropriate process standards and codes of practice, including systems to evaluate the requirements that contribute to the accomplishment of products standards.

3. To have an effective and transparent system that provides reasonable safety in compliance with products and process standards, which include the requirement of trained personnel, laboratories equipment, protocols and operating procedures (especially for the evaluation of areas and sanitary monitoring).

3. ORGANIZATION OF SANITARY CONTROL IN BIVALVE MOLLUSKS

3.1 INTRODUCTION

The sanitary programs applied to bivalve mollusks, including *Pectinidae,* are commonly managed by an Authority that is dependent on a central organization with competence in food sanitation matters. This is normally in coordination with other competent Authorities in related fields such as fisheries, processors industry, environment, or even, Authorities with unrelated competences depending on the program goals or applicable policy. Nevertheless, the laws of many countries often have basic sanitary approaches directed at the consumer's protection as a first objective with the facilitation of trade as an additional objective.

The organization which controls the sanitary condition of food as well as other fishery products, if any involve bivalve mollusks, has the main objective of ensuring and guaranteeing that only safe and sanitary products reach the consumer. At the same time, it should also ensure that these products can compete in the international market in terms of its production and sales activity by applying surveillance and control systems that are considered reliable by the destination markets, with which business agreements have been signed and compliance to specific requirements have been agreed upon.

In the food environment, two considerations must be taken into account to define the subscribed commitments. First, the legislation on food sanitation of the various parties must be harmonized, and in the case of trade, the party producing the product will have to harmonize its rules with those of the purchaser. The application of Sanitary and Phytosanitary Measures (SPS Agreements) of the World Trade

Organization (WTO) defines the application guidelines in this environment. Any country has the right to impose sanitary rules that it considers necessary to protect the life and health of its population, as well as those of animals and plants, as long as the imposed rules are not arbitrary, unjustified or discriminatory and rules must be science based. On the other hand, sanitary safety is based not only on having harmonized rules but also on the ability to ensure consistency between parties in the effectiveness of control systems.

Therefore, governments are responsible for harmonizing their food legislation with internationally recognized standards such as the *Codex Alimentarius*. In addition, surveillance and control organizations should be identified and designated without any ambiguity. Proper accreditation of the verification organizations that monitor quality and food safety systems with the purpose of guaranteeing the wholesomeness of the products that they process should be established. These general considerations must be reflected when a sanitary control system is designated for certifying a production enterprise as compliant with the accepted standards in the production and processing of *Pectinidae*. This will have to be organized within a wider scope, encompassing a broader approach to bivalve mollusks and establishing some exceptions based on considerations to local peculiarities.

3.2 ORGANIZATION AND FUNCTIONS OF THE COMPETENT AUTHORITY

Nowadays, the traditional inspection functions are applied as a systematic and continuing activity under the responsibility of the processing industry, qualifying it in some texts as a self-controlled industry. However, this function, more than that of inspection, is based on quality control and assurance, a function demanded by regulations of compulsory compliance by the industry.

Under this consideration, the Control Authority must be organized to carry out the verification function of the industry quality assurance systems which are applied through established guidelines, for example, the Hazard Analysis and Critical Control Points system. It does not mean that punctual inspection actions are not the responsibility of the Competent Authority, but the verification or audit is its first priority. In this sense they are now designated as Verifiers or Auditors. The qualification of these Auditors is now of greater importance allowing the Competent Authority increased effectiveness in their controls.

The activities of these inspectors are focused on the monitoring and control of activities in classified growing areas (including prohibited areas) and the activities of stakeholders in all stages of the production cycle, from spat collection, transporting, relaying, depuration and processing. These activities are very important to the sanitation program. The number of inspectors or auditors required depends on the number and location of the natural beds or aquaculture sites approved for exploitation. The inspectors' role in each area is aimed at verifying that only mollusks from approved areas enter the market. In cases where mollusks show certain levels of contamination, inspectors should make sure that these shellfish undergo a relaying and depuration process. Validation of statements made by fishers or harvesters is also an important role of these inspectors. This is in addition to their usual functions of surveillance and control of hygiene and sanitation of vessels, dispatch and treatment centers, and relaying or reinstallation areas. In some cases, these inspectors participate in the operation of sample collections for the sanitary monitoring program of approved areas as a verification activity.
At a central level, the sanitary control program for live bivalve mollusks must coordinate its performance with many Authorities. These would include Authorities in charge of the surveillance of processing plants,

laboratories involved in the sanitary programs and with the scientific Authorities that carry out many activities, such as those related to the identification of toxic phytoplankton species, study and classification of production areas, toxicity studies, and so on.

The Control Authority must have a network of laboratories preferably located near the bivalve exploitation areas. These laboratories do not necessarily need to be owned or managed by the Control Authority; however, they must comply with the requirements of the management systems needed for their quality and certification granted by the specialized Authorities dealing with an accreditation function. A central reference laboratory should be organized to verify the performance of the network of laboratories.

4. QUALITY SYSTEMS OF THE INDUSTRY

4.1 INTRODUCTION

In the current food industry, the operation under a formal quality assurance system is a regulatory requirement which should be based on the principles of the Hazard Analysis and Critical Control Points (HACCP). This represents the universal criterion of quality system in the sanitary food environment.

Recently the fusion of HACCP System, other criteria and standards in the food hygiene and safety area under the scope of the *Codex Alimentarius* and the ISO Standard for quality management (ISO 9001 series), have evolved into a new ISO standard designated ISO 22000. This fusion represents a more modern approach of quality management and is ready to be adopted by the food processing industry, although only under a concept of voluntary application.

4.2 ENTERPRISES OPERATOR RESPONSIBILITIES

The operators of establishments or individuals involved in the extraction, production, processing and distribution of bivalve mollusks and *Pectinidae,* in particular, must be formally recognized by the Authorities. This recognition should be either by the Sanitary Authority responsible or by the fishing or environmental Authorities. Such recognition can be in the form of a license or registration. The granting of a license or registration would indicate compliance with statutory provisions of the design, construction and equipment of the processing and operation premise in accordance with approved standards. License or registration

holders must operate expressly under the HACCP system and its pre-requirement programs.

The application and implementation of the HACCP system in the management of food safety requires that the enterprise has previously implemented and set a general program in motion. This program should be related to the control of hygiene and general sanitation of the processing plant. In the case of extraction or collection agents, truckers, handlers, dispatch centers or operators where classification, packing and preparation operations are performed, they must be registered beforehand by the competent Authority and comply with the general requirements of hygiene and traceability.

As the HACCP system aims to manage the process by controlling the hazard agents that may enter or develop during production, the pre-requirement programs focus on the basic considerations of general hygiene and other essential sanitary issues in the processing environment. Thus, the HACCP system must be clearly applied to all process stages.

Some issues discussed as part of the pre-requirements program for HACCP are listed below:

- Hygiene processing installations, specifically surfaces that are in direct contact with the mollusks, for example, surfaces of the vessels storage or transportation carriers, storage places and even the operator's hands.
- Cross-contamination prevention through initiatives such as introducing hygienic practices among plant personnel, separation of intact raw materials and shucked products and plant design aimed at preventing cross-contamination.

- Use of clean water only, whether in the washing and cleaning of the plant, facilities and equipment operations, or in purification operations in order to avoid recontamination of these bivalves.
- Prevention of product tampering or contamination by toxic compounds used such as detergents, insecticides and pesticides, including personnel training, labeling, identification, and proper storage of these substances.
- Control of personnel hygiene, specifically hands and personnel restrooms, preventing the contamination of products with microorganisms of human origin, either bacteria or virus. Furthermore, a health personnel control protocol must be established as an important preventive strategy that avoids product contamination risks.
- Elimination of pests such as rodents, insects and other animals through preventive strategies.
- Processing plants must have meticulous verification procedures and control records of the application and compliance to these pre-requirements.

The HACCP System application must be included in a HACCP plan, which will be available for the verification and control of the Competent Authority. In this plan, the process and its stages where control measures will be applied must be clearly established. The hazards identified in the bivalve mollusks shellfish originate mainly from the presence of pathogenic microorganisms of fecal origin (bacteria and virus) either human or animal in the aquatic environment as well as from pathogenic bacteria naturally present in the environment (*Vibrio sp*). As well, the presence of heavy metals and waste of chemical products of natural origin or from the presence of contamination and planktonic biotoxins also contribute to possible hazards.

Sanitary programs for bivalve mollusks shellfish, including *Pectinidae,* require that the harvest and production activity of these mollusks are carried out in areas approved and classified by the Competent Authority.

The classification is supported by the development of a meticulous sanitary study of the exploitation area. A forecast obtained from the study will establish the classification of the area and, according to the regulatory regimes, this may be classified in three categories A, B or C class. This is in accordance with the European Union standards related to the contamination levels of E. *coli*.

The operators of companies must use only bivalve mollusks from approved areas classified as “A” for direct human consumption. Mollusks originating from areas classified as “B” or “C” must be subject to a depuration or relaying process approved by the Competent Authority before being sent for direct human consumption or further processing.

A critical factor in mollusk processing is to maintain a record system and traceability of the products so that the origin and conditions of the production or extraction area can be identified at any time. This record system would be an important part of the regulatory sanitary requirements.

A traceability system in this case must at least assure that certain information required by the food safety and quality regulations be transported with the mollusks along the all stages of the process and distribution system and be available to the food Authority for inspection or verification purposes. According to food safety regulations the following information should have the ability to be traced:

- Code or name of the classified production area or depuration center of origin.
- Date and if it is possible the hour of extraction of the bivalves.
- Identification of the dealer or fishermen registered by the Authority responsible of the product who presented the declaration.
- Destination of the particular amount of bivalves, as an authorized processing plant, depuration center or whole selling market.
- Other information as boat name or number authorized by the authority, unloading place, identification of vehicle of transport and so.

The technological way to register and transport the information could be very simple as paper forms or very sophisticate electronic technical devises and sofwares.

5. *PECTINIDAE* PARTICULAR REQUIREMENTS

5.1 INTRODUCTION

The bivalve mollusk shellfish that belong to the *Pectinidae* family include a variety of genera and species widely distributed in the sea from the tropical to polar zones; for example: *Pecten, Argopecten, Placopecten, Chlamys, Patinopecten, Amusium*, among other genera. Although the number of species is large (perhaps more than 300) only a small variety of species are used in commercial foreign trade operations. In the international market, these bivalves represent high unit value merchandize that is marketed under the generic English name of Scallops, although other names are used depending on the market and local languages where the products are sold.

These products are harvested from traditional fisheries which use trawl nets and dredges. These wild fisheries from natural beds are in some regions a traditional activity. Typically, the harvesters of the vessels keep the product alive until it is landed or shuck the product on board, wash and then pack in small sacks buried in ice until it is unloaded. Currently, there are factory boats that freeze and process products on board which are immediately ready for the international market. Products processed on board are normally of high quality *Pectinidae* and are generally products of small scale fisheries, diving activities, part of incidental fisheries or by-catch from shrimp fisheries.
The aquaculture of these species has been developed over the last 25 years in different areas of the world. The quantity and quality of products are already evident in most markets. Farmed scallops usually have very high sensory quality and safety due to extremely efficient sanitary controls. *Pectinidae* are mainly sold fresh or frozen in the international

market with Individual Quick Frozen (IQF) adductor muscle roe-on or off, half shell or processed into dried or smoked products.

5.2 FEWER RISKS, MEANS LESS CONTROL

Similar to the U.S.A., sanitary programs applied to bivalve mollusks aimed at improving and promoting the safety of species such as oysters, clams, mussels and scallops, do not take into account *Pectinidae* when they are marketed as adductor muscle only. This is due to the fact that when the viscera is eliminated, the contamination risk by pathogenic bacteria that could be present mostly disappears as bacteria and viruses are accumulated only in the intestines and other parts of digestive organs.

The same could be said in reference to biotoxin contamination from phytoplankton origin and other contaminants, as they are normally accumulated in the hepatopancreas of the mollusks. Therefore, as viscera are eliminated, the health risk is prevented, eliminated or reduced to an acceptable level. Nevertheless, the presence of roe in some cases represents a risk depending on the species.

In the case of European regulations, the law establishes that the official controls applied to *Pectinidae,* which requires that they come only from classified production zones, may be waived. Instead, it could be carried out in a fish auction, dispatch, transformation centers or even in the processing plants. This consideration applies to products coming from distant or remote areas where human contamination practically does not exist. However, the established official controls do apply and must verify that the sanitary standards relevant to live bivalve mollusks are fulfilled. Such standards determine the limits of marine biotoxins and general standards of hygiene and handling of bivalve mollusks related to

sanitary requirements for food of animal origin as stated in regulation (CE) No. 853/2004.

From a commercial quality point of view under regulatory framework in issues not related to sanitation, such as fraud or labeling, the moisture content of the adductor muscle is a contentious issue that is not yet resolved. The peculiar characteristics of the *Pectinidae* muscle causes water absorption and retention when they are soaked or washed for a period of time in saltwater or fresh water. In some cases, they can absorb more than 25% of their weight in water. The act of tampering (alteration of the nature of the product) or fraud can be considered a criminal act which may also affect the sensory properties of the product. Some Authorities have applied criteria to judge this type of practice, however no agreement has been reached due to the differing characteristics of the various Pectinidae species. Some Authorities have proposed the use of limits as criteria for tampering as there is no consensus on the issue from the Codex Commission. Using this criterion, each market would have to apply particular measures of control so as to better inform the consumer, for example:

Moisture:	less than 80%: “dry” or “without water addition”. 80-82 % “product with water addition”. More than 82% cannot be marketed.

Other voluntary standards established for certification have taken into account wider limits (an additional 2% in each category) and the addition of water must always be declared when it is within acceptable limits.

Furthermore, another method for hydration control is being investigated and although an agreement has not yet been reached, it may represent a possibility for moisture control. Nevertheless, it will be necessary to prove its reliability and practical application. The concept involves

determining the water/protein ratio which can be characterized to each species and establish from this value a tolerable limit of moisture absorption.

Other considerations related to quality can be adopted to protect the consumer's interest, such as the use of certain claims on the label that describe particular characteristics of the species, apart from the moisture content, including the name and origin of the species. The possibility of declaring the aquaculture productions as organic is also an important consideration as there is an increased demand for organic products by consumers.

6. THE NEED FOR TRACEABILITY

6.1 INTRODUCTION

Recently, the Codex Alimentarius Committee defined in a simple way the concept of traceability so that it can be universally understood: "*it is the capacity to trace the path of food through all its production, processing and distribution stages*."

Although clear, the definition raises a question; is it useful to have the capacity to trace the path of food (in this case, a *Pectinidae* mollusks) through all its stages all the way to the point of sale or distribution among consumers? The answer comes from different demands and needs as pointed out below:

- Current sanitary regulations in food quality require traceability as a requirement inherent to the quality assurance systems applied to the entire food chain. It must be available at any time or stage of the food system (production, processing and distribution). However, it should be recognized that it is not a sanitary measure but a tool that can be used while adopting sanitary measures.
- Consumers require consistency in commercial practices and the capability to prove this through methods such as the identification of the goods' origin or the identification of species, among other considerations. Regular labeling is not enough to satisfy this need, but the traceability measures used in the production system would satisfy this consideration.
- From the sellers' point of view, traceability accounts for the precise time of a products removal and reduces the risk of tampering and any delays that may occur while getting the product to the market. Traceability can also lessen any damages in the event of a crisis

concerning a company's product in the market (for example, sanitary failures). From the Sanitary control Authority's point of view, it allows taking immediate and direct measures can be taken to protect consumers, controlling damages and giving the opportunity to investigate the origin of any mishaps.

- The ability to find information about the product's origin and background in any stage of the food chain is important in the bivalve mollusks or *Pectinidae* business where only products from approved areas during specific periods can be collected and used for direct human consumption.
- The ability to trace the path traveled by the bivalve mollusks at any point in time including: the extraction area, collection date, quantity collected, individual who harvested the product, products destination and other important information demanded from the market.
- The possibility to install a traceability system connected to official sanitary programs of bivalve products represents an important value in the commercial operation of small-scale fishery activities. As well, the capacity to enter into more demanding and profitable markets is possible based on meeting the general and specific sanitary requirements applied to food and bivalve mollusks such as *Pectinidae.*

6.2 TRACEABILITY IN SMALL-SCALE OPERATIONS

1. The first condition that must be met in order to establish a traceability procedure has to do with the identification of the fishermen or harvesting procedures through a registration and licensing procedure by the competent Authorities. This condition also applies to fishing and transporting vessels that carry out the harvesting activity. This registration or license procedure issued by the Authorities (such as a number or a code) is critical information

for traceability which must appear on the label attached to the box, sack, or container of mollusks, thus identifying the origin of the product.

2. The groups of containers that carry the mollusks with the same number or code constitute a “batch”. This also includes a group of sacks or containers with the same species harvested on the same date from the same area. This number or code allows the containers to be managed appropriately in the food chain; in this case, until received at a dispatch or purification center, processing plant or first-sale market.
3. Two records are consequently used; the first is the identification of sacks or containers; the second is a claim document where the harvest authorization is indicated (fishing license or registration). The identification of each unit is done by marking or labeling each sack or unit, indentifying the code of the harvester, the harvest date, destination and any other information that might be required by the Authorities. The claim document is a statement that the harvester makes when the goods are delivered. This statement includes at least the following:

    a. Identification code and production area classification.
    b. Species and quantity delivered (weight, number of specimens, size, etc.).
    c. Harvest or collection date.
    d. Code or name of the vessel used for transportation (authorized).
    e. Immediate destination of goods: identification of the receptor agent (code) and date of receipt.
    f. Name, code and signature of the extractor or his/her representative responsible for the statement (officially authorized).

4. This claim document must be enumerated and will be issued when the product is unloaded. It will be submitted to the receptor agent along with the batch. The document must contain all the necessary information in order to identify at any time the origin of the goods and any other information required by the regulations.

5. Receptor agents must keep a copy of this statement for a period of a year or more so that it can be verified or audited by the competent Authority.
6. The application of a traceability system for harvesting activities of bivalve mollusks represents an investment for harvesters and retailers requiring serious management that must be accepted as a need and commitment for the consumer. This issue must be a concern for everyone who participates in the harvest activity, whether gatherers, individual unions or associations. For practical purposes, the competent Authorities usually only recognize harvesters and producers if they are affiliated with an authorized union or association.

7. RELEVANT INTERNATIONAL REGULATIONS

7.1 INTRODUCTION

References on *Pectinidae* sanitation appear under regulations related to Bivalve Mollusks. NSSP in the U.S.A. is a well established program operating for nearly 85 years. A technical document that has been considered, and has evolved through a coordination and cooperation task among the Authorities and the industry, is currently named the "Guide for the Control of Mollusks Shellfish under the National Shellfish Sanitation Program (NSSP)" that is presented as a reference and an Ordinance Model for its application by local Authorities (States). This program has been used by other nations as an important guide for the sanitation management and control of bivalve mollusks, including *Pectinidae*.

Over the last few years, the European Union (EU) has been approving a harmonization process for food legislation at the community level, as well as the achievement of consistency in food control systems. This is being done through the use of a series of statutory provisions, some of them containing specific issues related to bivalve mollusks and *Pectinidae* in particular. These provisions regulate the microbiological contamination in the bivalves in two stages; the classification of growing areas and in the control of the end-product, both regulatory in nature. The classification criteria of the areas by the European Union are established in Regulations (CE) 854/2004 (Chart Nº1 of point 7.2).

In North America and other nations as Canada and New Zealand, the controls are mainly applied to the aquatic environment. In this sense, the United States legislation considers that from a microbiological point of view, when there is no point source of contamination that can affect a

growing area of mollusks bivalves and the contamination level measured in terms of total coli forms or fecal coli forms does not exceed 14/100 ml, then the product can be sent directly to the market.

A complex system of alternatives about the management and classification of growing areas according to seasonal changes or other types of considerations, are characteristics of the system developed by NSSP of the U.S.A. This includes criteria on statistical consistency and laboratory methods in order to guarantee the safety of bivalve mollusks. The microbiological limits of biotoxins and other residues of toxic compounds for end-products established by the US Authorities are shown in Chart 2 and 3, of point 7.2 while the ones established by the European Union for biotoxins are shown in Chart 4 in the same point.

It is also important to mention the work being developed by the *Codex Alimentarius* Commission in developing standards and codes of practice for bivalve mollusks and *Pectinidae* in particular. At this stage one norm and one code of practice for Bivalves Mollusks are on step eight of the procedures, while one norm and one code of practice for *Pectinidae* are at the beginning of the procedures (step three). These documents are examined below:

7.1.1 "Guide for the Sanitary Control of Mollusk Shellfish of the National Shellfish Sanitation Program (NSSP-FDA/CFSAN) 2008 the United States of America."

This document operates as the ordinance model outlining the minimal requirements used by the local Authorities that is the result of the cooperative work between the FDA, State Authorities representatives of the industry and other public agencies. This consolidates work experience gathered over the course of many years under the National

Shellfish Sanitation Program which was created in 1925. It may be considered as the most developed statutory technical guide to manage the sanitary issues around bivalve mollusks.

Regarding *Pectinidae* in particular, the Guide considers that the term "hellfish" used in this legislation refers to the following species:

- Oysters, clams, mussels presented as:
  - Shucked or in its shell
  - Raw or processed after the capture or extraction
  - Frozen or not frozen
  - Entire or by parts, and

- Scallops in any way, **except when the way or presentation of the end product is the adductor muscle only**."

Consequently, exports to the U.S.A. must comply with all sanitary standards established for the fish and fishing products. Additionally, the requirements of this Guide also apply when the product is something more than the adductor only, which is the common presentation of the muscle plus the gonads (roe-on).

7.1.2 Regulation (CE) Nº 854/2004 of the European Parliament and the Council dated April 29, 2004, whereby specific standards for the official controls organization of animal-origin products devoted to the human consumption are established (DO L 226 from 6.25.2004, p. 83)

This regulation deals with the organization of official controls applied to *animal-origin products*, including bivalve mollusks. The legislation mainly

deals with controls regarding bivalves in issues of relaying and production zones as well as the final product.

Chapter III, Annex II of this Regulation refers to the official controls related to *Pectinidae* harvested from classified production areas, specifying that these controls must be carried out in wholesale fish markets, harbors, processing or transformation centers. These official controls must verify compliance with the sanitary regulations related to live bivalve mollusks established in Chapter V, Section VII, Annex III of the Regulation (CE) Nº 853/2004, as well as the compliance of the provisions established in Chapter IX, Section VII, Annex III which refers to *Pectinidae* recollected from non-classified areas. These regulations indicate:

- The *Pectinidae* must not be put in the market, except when they have been hygienically gathered and produced, avoiding any physical damage that may affect the mollusk and in compliance with the self-control demands established by the regulations.
- In the event that they come from classified areas, the provisions of part A (classification) of Chapter II will be applied to the *Pectinidae.*
- The operators of food enterprises that use *Pectinidae* must:
  a) Comply with the registration document, which must clearly indicate the location of the zone where P*ectinidae* have been recollected or,
  b) Comply with the requirements related to identification, marking and labeling established in these Regulations.

7.1.3 Regulation (CE) Nº 853/2004 of the European Parliament and the Council dated April 29, 2004, whereby specific standards

for the hygiene of animal-origin food are established (DO L 226 from.6.25.2004, p. 83)

This standard refers to the sanitary demands for animal-origin products, establishing precise considerations for bivalve mollusks. The standard defines a bivalve mollusks as a **lamellibranchia mollusks that is fed through filtering**. The standard regulates the following:

- In general terms, it demands the picking or production of bivalve mollusks from sanitarily classified areas or zones.
- The need for relaying treatments on clean areas for long term purification processes for situations of higher contamination in the mollusks within permissible sanitary limits.
- The possibility of thermal treatment in the transformation process.
- Requirements for bivalves in terms of organoleptic characteristics of freshness and viability, including the lack of dirt in shells, reaction to percussion, and a normal quantity of intervalvar liquid.
- It regulates the content of marine biotoxins, (see Chart Nº3 of point 7.2)
- It regulates the treatment of the relaying processes as well as the operating conditions of the processing centers and depuration establishments.

7.1.4 Standards and Codes of Practice from Codex Alimentarius

a) Draft Code of Practice for Fish and Fishery Products (Live and Raw
Bivalves Mollusks and Lobsters)
b) Draft Standard for Raw and Live Bivalves Mollusks
c) Proposed Draft Standard for Quick Frozen Scallop Adductor Muscle Meat.

d) Proposed Draft Code of Practice for the Processing of Scallop Meat.

Regarding *Pectínidae*, the documents refer to products presented as adductor muscle only, which are stated in the standard as "scallop meat", and quality control in general. One such measure refers to the muscle humidity of *Pectinidae* which must be carried out through the application of good practices. However, neither a limit for the content of muscle humidity nor any other method to identify abnormal situations has been proposed so far.

7.2 TOXIC COMPONENTS, BIOTOXINS AND MICROBIOLOGICAL RULES

Chart 1: Sanitary Criteria of the Classification of Production Areas of Bivalves Mollusks

Classification of growing or production areas of Bivalves Molluscan Shellfish, including Pectinidae	Contamination level in Escherichia coli terms	Reference Regulation (CE) 854/2004
Class A	Less than 230/100 g of meat	Direct Human Consumption
Class B	More than 230 and less than 4600/100 g of meat	Consumption prior to the purification process
Class C	More than 4600 and less than 46000/100 g of meat	Human Consumption prior to the conditioning process
Prohibited	Above 46000/100 g of meat	

Chart 2: Microbiological Safety Levels in Regulations FDA & EPA (the US)

Fishing Product	MAXIMUM LEVEL OF AGENT
Product ready for consumption (minimum cooking time by the consumer including *pectinida*e adductor muscle).	Enterotoxigenic E. Coli: $1x10^3$/g LT or ST positive
	Listera monocytogenes : presence
	Vibrio cholerae: toxigenic presence 01 and non 01
	Vibrio parahaemolyticus : equal or higher than a 10^4 Kanagawa +-
	Vibrio vulnificus: presence
Any type of fish, including pectinidae adductor muscle	Salmonella (species): presence
	Staphylococcus aureus : positive for enterotoxin
	Staphylocuccus aureus: equal or higher than a 10^4 (NMP)
(*)Reference: Table Nº A-5 FDA & EPA Safety Levels in Regulations and Guidance Fish and Fisheries Hazards & Control Guidance, 286 pp, Third Edition , FDA/CDSAN, June 2001	

Chart 3: Limits for Marine Biotoxins

Paralyzing Shellfish Poisoning (PSP)	800 micrograms /gram
Amnesic Shellfish Poisoning m (ASP)	20 mg /kilogram of domoic acid
In case of okadaic acid, dinophysistoxins and pectenotoxins.	160 micrograms of equivalents of okadaic acid per kilo
In case of yessotoxins	160 micrograms of equivalents of azaspiracids per kilo
Ref. Regulations (CE) 853/2004 of the European Parliament and Committee	

Chart 4: Heavy Metal Waste and Biotoxins (US FDA)

Type of Mollusks	Toxins and toxic substances
Oysters, clams, mussels and scallops (with gonad)	Arsenic: 86 ppm; cadmium: 4ppm; chrome: 13 ppm; lead: 1.7; nickel: 80 ppm; mercury: 1ppm.
	PSP: 80microg/g; NSP: 20 unit Mouse/100g brevetoxin 2 equiv. ASP: 20ppm a. Domoic.

Reference: Chart Nº A-5 FDA & EPA Safety Levels in Regulations and Guidance Fish and Fisheries Hazards & Control Guidance, 286 pp, Third Edition, FDA/CDSAN, June 2001

APENDIX

PROPOSAL

GUIDELINES TO HARMONIZE QUALITY AND TRACEABILITY STANDARDS IN THE *PECTINIDAE* TRADE IN ASIA-PACIFIC REGION

i. INTRODUCTION

From the information gathered by the specialists hired for the Project [3] and the analysis carried out by the Peruvian consultant, we conclude that the development and exploitation of bivalve mollusks, especially *Pectinidae,* in the Economies of the Asia-Pacific Region, exists a high degree of development in the future. This includes the technologies applied to its use, the sanitation and quality assurance systems used by operators of industrial companies as well as by other people who participate in the production cycle such as fishermen, handlers, traders, haulage contractors, and so on.

A key element that is directly related to the technological development level of the production and trade activity of these mollusks is the participation of the competent sanitation Authority. This Authority would lead the application of programs specialized in the management of the safety of these bivalve mollusks under a regulatory approach.

These programs, along with the support of other participating elements of assistance, including instruments and strategies for the wholesomeness and quality control of food safety assurance, show a varied development and

[3] Wifredo Yap, Guofan Zhang, Tarloachan Singh , Eduardo Uribe and Alejandro Alonso.

degree of organization with regards to standards and regulating procedures, as well as the management and administration systems of control programs.

Some represent, not only at regional level, but also at global level, very well regarded and effective pioneering programs that have been developed and applied by the most advanced economies for approximately 85 years. These programs have developed through a long, continual, evolution process until settling in their current form[4]. The basis of these programs has been supported in the modern criteria of risk analysis and is used as a reference in the legislation of many countries or economies around the world. However, we also find that, in the Region, some economies lack sanitary regulations for bivalves, especially *Pectinidae*. This situation prevents them, in the case of international trade, from showing consistency in their regulations as well as in the effectiveness of their controls in order to participate in the commercial trade of this species.

Additionally, there exists a series of native species and relatively successful productions of *Pectinidae* that are exploited in some economies without obtaining the economic benefits that the international market usually offers. This is due to their lack of compliance with the sanitary conditions that are currently demanded by the market, which have been especially critical in the pre-capture stage. Taking into account these particular situations, the proposal is mainly aimed at helping the economies of the Region create sanitation "programs" in order to support small-scale fishing activities or aquaculture and control any hazard that these mollusks may encounter. At the same time, this proposal aims to demonstrate that the Region is in a position to be able to meet the necessary sanitary demands required to access the international market of *Pectinidae* and bivalve mollusks.
Keeping in mind that the objective of these regulations and programs is to promote a *Pectínidos* exploitation activity in small-scale fisheries the cost-

[4] a) US. NSSP, Guide for the Sanitation Control of Shellfish (Molluscs) 2007; b) Canadian Shellfish Sanitation Program (CSSP).

benefit concept is a fundamental factor that must be taken into account. For this reason, the sanitation programs shall be regarded, not only for *Pectinidae,* but for all bivalves. This may even be extended "by analogy", to live echinoderms, tunicates and marine gastropods with the exception of the provisions on purification, as it is established on Section VII Point 1 of Regulation (CE) No. 853/2004.

In addition, the participation of regional laboratories and inspection stations or research programs shall be adequately supported on a technical and economic basis.

ii. APPLICATION OF SANITATION CONTROLS

The bivalve mollusks such as oysters, clams, mussels and scallops, are sedentary sea animals that feed themselves by pumping relatively big volumes of water through their gills. In the process of feeding, they accumulate pollutants of chemical or microbiological origin contained in the water which in turn are directly transmitted when these are consumed either entirely, with viscera and/or raw.

Unlike the fishing activities, which can be carried out from the sanitation point of view in any part of the aquatic environment without the need to have permits or licenses, unless specific restrictions are established for particular areas, the harvest or extraction of bivalve mollusks should only be carried out in areas duly approved and guarded by the competent Authority. This means that harvest is prohibited in the entire aquatic environment, except areas that have been especially approved for its exploitation.

This basic concept is applied in countries with advance sanitary safety systems as well as in the business exchange of these bivalves with other countries. This approval is based on the results of a presence, magnitude and variability study

of five general hazard factors, which can be found in the aquatic environment and in the bivalve mollusks themselves and can be described as follows:

1. Pathogenic microorganisms of human or animal feces origin, which is the result of pollution;
2. Heavy metals naturally contained in the aquatic environment;
3. Chemical product residue of different origins that originate from human activity developed on the ground or in the sea and are received as pollutants by the sea or aquatic environment;
4. Pathogenic bacteria that naturally exists in the sea;
5. Toxic phytoplankton species whose biotoxins are consumed and reside in the bivalves.

Additionally, it is a fact that these bivalve mollusks are commonly consumed raw and with viscera, or under very light thermal treatment, which increases the sanitation risk particularly from the microbiological point of view. When bivalve mollusks are consumed whole or with gonads, the high temperature of cooking does not affect the biotoxins, if present. This makes the risk of poisoning very high when consuming these products. The same could be said regarding other toxins. The control measure for pathogenic bacteria and viruses, as well as toxins of different origin, is to consume only eviscerated bivalves. A close monitoring and analysis of mollusks and water during the collection period is a necessary sanitation measure that may reduce the risk of contamination to an acceptable level. Due to this, international trade often requires certification of lot-to-lot biotoxins to confirm their absence, regardless of the fact that these mollusks came from approved and open areas.

The approval of areas is, to a certain extent, a complex and expensive process not only because it will be necessary to develop a survey that identifies and locates all actual and potential sources of pollution and estimate its influence on a bivalve mollusks production area, but also because it shall establish a control pattern during the exploitation stage by means of a continuous verification of

the survey results. Changes in the trends of established patterns will require re-evaluations, changes in the classification status, closing of the areas or even more extreme measures.

iii. GENERAL STRATEGY OF QUALITY ASSURANCE

The system of Hazard Analysis and Critical Control Points (HACCP) represents the reference system for food safety assurance in any production and transformation process. If we define the process that we should control as “the growth of bivalve mollusks shellfish in the aquatic environment” (referring to the area that is being controlled), we observe that the five factors of hazard can be difficult to control and, since there may be no other control measure to be applied, other processes that can be controlled should be chosen. For example, after a situation of pollution caused by enteric pathogenic bacteria, the control measure is the prohibition of bivalve exploitation during which the infection of a consumer is prevented by banning the sale of these mollusks. Closures are a measure that can be controlled

The same could be applied in the case of the natural presence in the aquatic environment of marine biotoxins or bacteria of *Vibrio vulnificus*, or of heavy metals from a natural origin. On the other hand, if we refer to pollutants of chemical, industrial, mining or from other human activities that enter the aquatic environment and the growing area of bivalves through a specific source of pollution, for example a river, a valid control measure would be the control of the pollutant agent spillage. However, in practice, pesticide and hydrocarbons waste, as well as other innumerable pollutants can be commonly found in the coastal strip which may be capable of dangerously contaminating bivalve mollusks that grow in this marine zone.

Using detailed surveys, the behavior patterns of the environment can be determined within a reasonable limit. These surveys can be used to determine

whether or not polluting agents have been found and if the mollusks can be considered safe for consumption. If it is established that a sanitary survey conducted over a specific growing area confirms the existence of contaminants to a harmful degree, it should be presumed that the bivalve mollusks are also contaminated and are not fit for human consumption. In such cases, the competent Authority should prohibit any activity to collect or extract bivalves from this area. Consequently, the results of a sanitary survey on the aquatic environment of a specific area represent the sanitation control measure required in sanitation quality assurance processes such as HACCP.

These sanitary surveys could help conclude that if an area is clean and unpolluted, the bivalve mollusks that grow there can be consumed, even raw. Additionally, if they present non-critical pollution they can still be consumed, provided that prior to consumption they undergo a depuration process through which the pollution level is reduced to a level lower than the maximum permissible level established in regulations. In the same respect, if pollution is deemed critical according to the survey results, the exploitation of bivalve mollusks or *Pectinidae* of the area must be prohibited.

The international legislation on bivalve mollusks also discusses how additional **measures shall be applied in order to guarantee the validity of the survey results** and that the sanitation quality of the studied aquatic environment has not changed. Monitoring and follow-up measures or actions on hazardous factors that the environment may present as a result of an abnormal situation or missing from the initial study are applied this way. Some examples of these measures or actions are:

- Sampling and analysis for fecal pollution in stations strategically located to measure the impact of pollution sources (usually every two weeks);
- Sampling and analysis to verify the level of chemical pollutants (every six months or when there is suspicion of a change in the established patterns);

- Weekly or more frequent controls of phytoplankton and mollusks in strategic points to determine possible presence of planktonic biotoxins;
- Sampling and verification of extraction activities including patrolling of prohibited areas in order to guarantee that only products from approved classified areas arrive in the markets.

The sanitary survey establishes a predictive pattern of behaviour concerning the sanitation quality of the aquatic environment and bivalve mollusks. Consequently, the survey results must be viewed as the preventative quality control measure that must be applied where the appearance of a hazardous agent has occurred in order to reduce the risk of danger to an acceptable level. When microbiological examinations on bivalves are used, these are only useful to confirm the effectiveness of the applied sanitation practices but are only meaningful when the origin or history of the lot provided is known, such as through the use of a sanitary survey.

In the case of the presence of planktonic biotoxins, an occurrence pattern can be difficult to determine either during a specific time or in aquatic space. Thus, the quality assurance regarding prevention of these biotoxins is the result of the close monitoring of areas under exploitation as well as the bivalves analysis. However, these are not always reliable due to the statistical uncertainty of monitoring, the results of bioassays or other considerations related to the mollusks involved. The identification of toxic species is used as a support for the chemical or bioassay analysis. However, the presence of small quantities of cells of toxic species in a given moment in the aquatic media does not necessarily mean that the mollusks shellfish has not accumulated toxins at hazardous levels.

iv. COMPONENTS OF A PROGRAM FOR BIVALVE MOLLUSKS SANITATION CONTROL

The main components that an effective and efficient sanitation control program in compliance with international requirements for bivalve mollusks are described as follows:

a) Program Elements

1. Competent Sanitation Authority in charge of the sanitation control of bivalve mollusks shellfish.
2. Local stations or units dependent on the Central Authority.
3. Other competent Authorities regarding environmental, fishing or aquatic issues with which the Sanitation Authority coordinates his/her actions.
4. Public or private official laboratories that provide monitoring and analysis services for carrying out sanitary surveys and monitoring of areas during the exploitation period. These shall operate under accreditation systems and must be authorized by the Competent Authority for sanitation control.
5. At least one Reference laboratory through which the “interlaboratory” activities are carried out in order to standardize and verify the correct application of analysis and trial methods. This center or laboratory can also operate as a research center on biological, chemical or toxicological issues as a support for the exploitation activity of *Pectinidae.*
6. Local action committees managed by the local Sanitation Authority represent an effective strategy for the spread of rules and regulatory procedures and their harmonized application with the participation of all elements involved in the production system, such as labor unions, harvester associations, vessels owners, and representatives of relaying areas and depuration or processing plants.
7. Adequate and qualified trained inspectors with knowledge of regulation, preferably at a graduate level in fields such as public health, hygiene, or food processing, and will represent an important element for the efficient operation of a sanitation control programs.

b) Regulatory Standards and General Procedures

1. A statutory standard of sanitary requirements of bivalve mollusks including particular matters on *Pectinidae* shall be approved.
2. This regulation shall be harmonized with other internationally recognized regulation, such as the US NSSP or the European Union Regulation (CE) 853/2004 and (CE) 852/2004.
3. A particular statute regarding the organization and functions of the competent Sanitary Authority shall be approved and harmonized with the US NSSP and the European Union (CE) 854/2004.
4. Descriptive protocols for sanitary surveys shall be approved.
5. Procedures and methods of sampling and analysis must be ISO certified or established by the markets.
6. European regulations classify the growing areas as Class A if the bivalve mollusks collected from this area do not exceed 230 *E. coli* per 100 grams of flesh and intervalvar liquid (using for this purpose, the NMP test with five tubes and two dilutions of ISO 16649-3). The products of this classification could be sent to the market. However, those considered Class B could not exceed 4600 *E. coli* calculated under the same method and, before their dispatch to direct consumption, must go through a depuration procedure that allows a reduction under 230 *E. coli* established for Class A. Finally, bivalve molluscan shellfish with quantities greater than 4600 *E. coli* per 100 grams of flesh and intervalvar liquid but less than 46 000, can only be sent for direct consumption after they reach the class level A in a long process of "reinstallation" in the sea (depuration in a marine area classified as A).
7. Specific regulations about laboratory methods that must be applied in the sanitary surveys for the area classification shall be approved particularly for total and fecal coliforms or, *E. coli.* Principles on methods and procedures for the analysis of biotoxins through chemical methods or bioassays shall also be approved according to market demands.

8. The classification of production or growing areas shall agree with the criteria of US NSSP or with those of European Union U which shall differentiate approved areas from prohibited areas and from any situations which result in a conditional approval or restriction.
9. Protocols that guide the execution of sanitary surveys shall be approved so that all the areas are classified under the same patterns.
10. An important element of the supervision structure and sanitation control is the inspector of the control system who would have the following responsibilities:

    - Ensure that only bivalve mollusks from approved classified areas are marketed directly to the consumer and/or, if required, been subject to a depuration process before entering the market for direct human consumption.
    - Supervise the legal documents that must be issued by collectors of bivalve mollusks, aquatic producers or other such representatives of the purification or reinstallation centers. These documents are important to the traceability system that each bivalve mollusks must strictly adhere to.
    - Participate in, or supervise, the sampling procedures carried out by third parties or approved laboratories that participate in the control system and certification areas, fulfilling sampling procedures and analysis established for the classified areas.
    - Audit processes in the pre-capture stage in order to verify compliance to the regulation by validating the information provided by laboratories (compliance with the classification and the operational status of the areas) and, in some cases, by verifying that only raw material from approved areas are processed by processing plants or facilities.

- Other responsibilities as an Authority of Sanitary control are the capacity to audit, verify, inspect batches of bivalve mollusks shellfish and if necessary, stop batches suspected of non-compliance.

c) Standards applied to *Pectinidae*

1. Sanitary regulations concerning Bivalve Mollusks from the most developed economies of the Region, including the regulations about Bivalve Mollusks of the European Union, establish certain differences between adductor muscles of only *Pectinidae* from outside classified production areas.
2. In the first case, the definition of Bivalve Mollusks specified in the US NSSP does not apply to this type of presentation. This difference is based on the following: when they have only adductor muscle and not viscera, gonads, shell or mantle, the risk of having enteric bacteria or virus or heavy metal or waste chemical products as a result of the environmental pollution and biotoxins of planktonic origin, is not the same when they are raw, with shell and viscera. In these cases, most of the pollution is accumulated in the intestines, hepatopancrea and other visceral parts. Contamination in the adductor muscle may be very much reduced.
3. These fresh or frozen presentations are considered fishery products and therefore the sanitary standards established for fishery products in general are applied to them. This statutory distinction exempts this presentation from the obligation of having to come from classified and approved areas that also go through sanitary studies and purification procedures. However, in the case of the US, Title 21 Part 123 about Procedures for Sanitary and Safe Processing and Fish Import and Fishing products (particularly HACCP application) and and Part 110 of Title 21 the US Code of Federal Regulations (CFR) about general food hygienic practices In the second case, the Regulations (CE) No 853/2004 allows for the *Pectinidae* to come

from non-classified areas. This refers to remote origins commonly referred to as fishing in open water. Since there is no risk of pollution, they are exempted from the requirements of classified areas unless the area had previously been classified by the Authority. However, the remaining statutory requirements established for the bivalve mollusk according to hygiene, sanitation (biotoxins), handling aspects and the contents will be applied in the Regulations (CE) 852/2004 on food hygiene in general.

The recommendations and directions presented are intended to promote the development and implementation of sanitation *programs* that are equivalent to the requirements expected by the international market in order to allow for participation in the international market.

v. CONDUCT OF SANITARY SURVEYS

The food safety regulations of developed countries require that sanitary surveys be conducted in the growing or production areas of bivalve's mollusks. It is accepted that the quality of bivalve mollusks depends mainly on the quality of the water where they occur and that because they are filter feeders, they may absorb whatever contamination is found in the sea. Thus, current sanitary legislation, besides the concepts of post-capture control, has considered a pre-capture control strategy as a way of including preventive rational measures that allow microbiological control of finished products to be more effective, more useful and less expensive. This strategy seeks to control or reduce the risk of infection to humans by pathogens such as salmonella. It is accepted that the risk of viral illnesses can be reduced but cannot be totally eliminated.
These controls consist of:

a) A microbiological classification of the production and relaying areas;

b) Purification treatments that allow the bivalve mollusks to comply with the sanitary specifications for end products.

The main purpose of the sanitary study is to assess the potential of fecal pollution sources that affect a certain production area of bivalve mollusks, establishing sampling plans for a microbiological supervision during the exploitation of the product and its growing areas. According to the European legislation (CE) 854/2004, if the Sanitation Authority decides to classify an area, it must:

1. Conduct an inventory of the pollution sources of human or animal origin that may potentially contaminate the production area.
2. Examine the number of pollutants that are released during different times of the year according to seasonal changes, water level of rivers, rainfall, impact of human or animal population, water treatment in cities, etc.
3. Establish the circulation characteristics of pollutants according to the current patterns, bathymetry and tidal cycle in the production area.

The key tasks of the development process of sanitary surveys for bivalve mollusks production areas include the following: a table study, shoreline study and vmicrobiological assessment. The following recommendations are established for the development of these surveys:

a) To use all the information available in libraries or specialized institutions, such as oceanographic and hydrological reports, navigational charts or geographical maps, rainfall reports, sanitary reports or studies of river or watersheds of cities, biological information of natural banks of species in areas that are being studied and so on;
b) Geographical proximity of the pollution source and production areas.

c) Effectiveness of wastewater treatment processes which are directly released near the production areas or rivers that flow in front of or near the production areas.
d) Description of agricultural activities in the surroundings.
e) Impact of rainfall on the regular volume of discharge to the sea and possible impacts on treatment systems of wastewater, flooding and sea shore pollution.
f) Tide and current actions.
g) Winds and seasonal environmental conditions.
h)Particular characteristics of species in terms of retention and accumulation of microorganisms and other environmental pollutants.
i) The physical study of the shoreline must be carried out meticulously, identifying all and every potential source of pollution. Those identified should be confirmed in the study of secondary data and maps, incorporating those not identified in the previous study. The use of GPS and appropriate maps represent important instruments for the study.
j) The location of natural banks and aquatic production areas must be specified in the maps.
k) A microbiological study must establish the sampling points so that the areas can be classified and identified according to the sanitary standards outlined in the regulations (approved, prohibited, conditional or restricted).
l) The location of microbiological sampling points shall be selected to represent location points that provide adequate information, and are present, during the hydrographical and less favorable conditions where chances of pollutants are high in bivalve mollusks which respond rapidly to an increase in the number of bacteria or virus in their environment. Thus, a study may be necessary to help in the identification of the most favorable locations and the use of a greater number of sampling points (water and mollusks samples), so that they can be used to monitor classified areas.

Asia-Pacific
Economic Cooperation

Requirements for the Pectinidae (“Scallops”) Species Trade in the Asia Pacific Region

Harmonizing Quality and Traceability Standards for Pecten trade in Asia Pacific Region
FWG 04/2008 project
Proposed by PERU

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1. General Considerations:

The information presented immediately after is concerned with the particular requisites that commonly country border Authorities apply when lots of raw or frozen “scallops”are presented for clearance. In order to follow the criteria adopted by some economies to assure the safety and wholesome of bivalves mollusks shellfish which include the scallops, we classify the economies in two groups:

a) Economies that have adopted the US NSSP (The National Shellfish Sanitation Program) applied to mollusks bivalves in general by signing a MOU between countries authorities and the US FDA, and b) Economies that have not signed a MOU with US.

2. Economies that have adopted the US NSSP

The following Economies have signed MOU with the US FDA concerning trading aspects on the sanitary quality and safety of bivalves mollusks: Republic of Korea, Chile, Mexico, New Zealand and Canada. All countries belong to APEC economies.

2.1. The meaning of NSSP

The NSSP is a voluntary, tripartite program composed of state officials, the shellfish industry, and Federal agencies. FDA coordinates and administers the NSSP. In each participating state, one or more regulatory agencies manage the sanitation programs for domestic and imported shellfish. A foreign country may export molluscan shellfish to the U.S. by agreeing to abide by the NSSP. This agreement takes the form of a bilateral agreement

or Memorandum of Understanding between the FDA and the foreign country.

- The Memoranda of Understanding on Shellfish Sanitation (MOU) stipulates the respective responsibilities of the exporting country and FDA in assuring that all provisions of the NSSP are met. After an MOU is signed, FDA conducts periodic program evaluations of the foreign country's program using the same criteria applied to state shellfish control programs.
- Under the NSSP, the definition of shellfish is limited to mollusks bivalves - oysters, clams, mussels and whole or roe-on scallops. Thermally processed, hermetically sealed and cooked products are not regulated under the NSSP. However, all other oyster, clam, and mussel products which are not shelf stable at room temperature are covered by the NSSP.
- Each participating state and country classifies its shellfish growing waters, inspects shellfish packing/shucking facilities and issues certificates (certifies) to individual shellfish dealers that meet NSSP control criteria. FDA evaluates state and foreign shellfish sanitation programs, insures standardization of laboratory procedures and coordinates shellfish research.
- FDA publishes monthly the Interstate Certified Shellfish Shippers List (ICSSL) which consists of certified shellfish dealers. The NSSP member states require that only shellfish products from dealers listed in FDA's ICSSL be accepted. Individual state requirements under the Food Code, require that shellfish products be from a certified "source of origin." Proof of origin is dealer listing in the ICSSL. Products are rejected by states if they do not originate from a dealer listed in the ICSSL. In most cases, rejection does not require product testing. Once dealer

certification is documented, product testing by FDA does not normally occur. However additional rejections may occur based on quality and safety monitoring performed by the receiving jurisdictions.

2.2. Obtaining a Mollusks Shellfish MOU with FDA

Obtaining program acceptance that result with the formal signing of an MOU is a lengthy process. Steps leading to the signing of a MOU include: officials of the applicant nation developing a letter of intent with FDA; technical training of foreign shellfish sanitation officials in the U.S.; the applicant's request for and successful receipt of clearance from National Marine Fisheries Service (NMFS), National Oceanic and Atmosphere Administration, U.S. Department of Commerce, to import live or shells-on shellfish; FDA on-site evaluation of microbiological laboratories; and participation in triennial on-site program audits conducted by FDA that verify the effectiveness of the applicant's program by visiting and evaluating both the shellfish growing areas and firms certified to ship shellfish

- Concerns are addressed by the National Marine Fisheries Service (NMFS). These concerns relate to the introduction and transfer of exotic species, aquatic disease organisms, and parasites that have the potential to adversely affect our domestic fisheries. Therefore, MOUs on shellfish sanitation require statements on environmental risks associated with the introduction of live and shells-on shellfish (contact NMFS).
- FDA will only negotiate the development of a MOU with authorized officials representing the government of the exporting nation. Generally these governmental officials operate through a ministry of health, agriculture, or fisheries.

2.3 Obtaining Listing in the ICSSL (Interstate Certified Shellfish Shippers List)

Foreign programs must be evaluated by FDA to assure that they fully meet NSSP certification criteria before shellfish dealers are listed in the ICSSL. Like state programs, foreign programs must meet the NSSP standards for classification of growing waters and certification of firms. The effectiveness of the NSSP sanitation controls is dependent upon the quality of the shellfish when they are harvested. The quality of bivalve mollusks shellfish is dependent upon the quality of the waters where they are grown. The fundamental principles governing shellfish sanitation are:

1) That shellfish must be produced in areas shown to be safe and free of direct fecal contamination, and marine biotoxins;

2) That only shellfish from properly classified growing waters may be harvested;

3) That sanitary practices are maintained from time of harvest until retail sale; and

4) That shellfish are properly identified (labeled) to include date and place of harvest.

2.4. Procedure for MOU Initiation

The development of an MOU with the FDA is initiated by submitting a formal "letter of intent." This letter must include a commitment that the applicant will provide the funding and personnel needed to develop and operate an ongoing comprehensive shellfish sanitation program. In addition, the letter should define the governmental agency or agencies that will participate in the MOU development. The inclusion of a table of organization (organogram)

and a brief narrative report describing the various levels of government, their responsibilities, and how they will interact will facilitate the FDA understanding of the proposed shellfish sanitation program. The letter of intent should be addressed to:

U.S. Food and Drug Administration
Office of Constituent Operations
International Activities
200 'C' Street SW. (HFS-585)
Washington, D.C. 20204

2.5 Additional information

The following institutions represent the competent authorities in each of the referred economies:

2.5.1. Canada:

The following institutions are involved in the application of the NSSP:

a) Canadian Food Inspection Agency- CFIA
   Regulates the import and export, processing, packaging, labeling, shipping, certification, storage, repacking of bivalve's mollusks to protect against contamination and product quality.
   Regulates depuration
   Evaluates laboratories performing shellfish analysis

b) Enviroment Canada
   Classifies all actual and potential shellfish growing areas

c) Fisheries and Oceans Canada, Fisheries Management

Controls the harvesting of shellfish from areas classified as contaminated or closed
Patrol growing areas
Regulate and supervises relaying and transplanting.
Restricts the harvesting in a public emergency
Regulates licenses, harvesting locations and times and minimum sizes.

2.5.2. Chile:

Competent Authority: Secretariat of Health (Ministry of Health)
Food Regulations D.S. 977/ 96, Food Health Regulation
Food Import Procedures: www.seremisaludrm.cl

2.5.3. Korea:

Competent Authority: National Fisheries Products Inspection Services /Regional Korea Food and Drugs Administration
http://kfda.go.kr/index2.html
Regulations: Food Sanitation Act

2.5.4. Mexico:

Competent Authority: Ministry of Health of the United Mexican States.
Regulation: MOU through the Federal Commission for Protection from.

Sanitary Risks covering the Safety and Quality of Fresh and Frozen. Aquacultured Mollusks Shellfish exported from the United Mexican States to the United States of America.

2.5.5. New Zealand:

Competent Authority: New Zealand Food Safety Authority.
Reference Regulation: IAIS 005 1 Shellfish Quality Assurance Circular 2003. This circular applies to all bivalve shellfish grown in New Zealand for human consumption, including all species of clams, cockles, geoducks, mussels, oysters, pipis, scallops, and tuatuas. When the final product is the adductor muscle only, or muscle with roe on only, shellfish shall be excluded from the requirements of this circular, except for the requirements for toxic substances, marine biotoxins and labeling and record keeping requirements as is indicated in the circular.

3. Economies that apply general food hygiene and safety requirements to the import and export food products (have not a signed MOU with US)

3.1. Australia

Competent Authority: Department of Agriculture, Fisheries and Forestry. AQIS Australian Quarantine and Inspection Service.
http://www.aqis.gov.au/con 32/asp/ex_querycontent.asp
Regulations: Imported products must comply with the provisions of the Imported Food Control Act 1992.

http://www.comlaw.gov.au/ComLaw/Legislation/ActCompilation1.nsf/0/6411BD5BBBC672DECA256F710050A7D0?OpenDocument

3.2. Brunei Darussalam

Competent Authority: Department of Fisheries (DOF), Ministry of Industry and Primary Resources (MIPR). Responsible for Control of Import and Export Fishery products (Food safety).
Regulation: Brunei Law Chp. 61;
http://www.agc.gov.bn/LOB/PDF/Chp.61.pdf

3.3. People's Republic of China

Competent Authority: General Administration of Quality and Supervision, Inspection and Quarantine- AQSIQ- . Responsible for inspection, supervising, and administering the safety and quality of the imported and exported food and cosmetics.
Regulations: Food Hygiene Law of the People's Republic of China:
http://www.chinafdc-law.com/laws/detail_156.html

3.4. Hong Kong, China

Competent Authority: Food and Environmental Hygienic Department
Regulations: Hong Kong Food Law: http://
fehd.gov.hk/safefood/foodlaw_list.htm#fc
Guide to import of marine Products into Hong Kong:
http://www.fehd.gov.hk/safefood/safe-marine.html

3.5. Indonesia

Competent Authority: Republic of Indonesia Agency of Agriculture and Quarantine. MOA.
Regulations: Law of the Republic of Indonesia No 16 of 1992 concerning animal, fish, and plant quarantine
http://www.ippc.int/servlet/CDSServlet?status=ND1ucHBvaWQuNDAxOTgmNj1lcyYzMz1sZWpc2xhdG/vbiYzNz1pbmZv

3.6. Japan

Competent Authority: Ministry of Health and Welfare:
http://www.mhlw.go.jp/english/index.html
Regulations: Food sanitation Law: contain regulations for product examination and import notification. Chap.4 and 5: http://www. Jetro.go.jp/en/reports/regulations/

3.7. Malaysia

Agencies involved in the import/export certification of fishery products:
Ministry pf Health: inspection of fish and fishery products exported or imported from or to Malaysia:
http://moh.gov.my/MohPortal/index.jsp?lang=en
Fisheries Development Authority of Malaysia: issuing export/import licences
Regulations: Food Act 1983:
http://fsis.moh.gov.my/fqc/ReferenceBooks/actDetail.asp?id=43&FAD_ID=175&vn=29&FAS_Title=Part%20IV%20Important,%20Warranty%20And%20Defenses&FAC_ID=22

3.8. Papua New Guinea

Competent Authority: National Health Department. Ministry of Health
http://www.health.gov.pg

3.9. Peru

Competent Authority: Technological Fishery Institute (ITP) through the National Service of Fishery Sanitation (SANIPES) www.itp.org.pe
Regulations:
a) DS 040/2001-PE "Sanitary Standard for Fishery and Aquaculture Activities"
b) DS No 07/2004/PRODUCE: "Sanitary Standards for Live Bivalves Mollusks"
c) "Food Safety Law" (2008), Art. 18-19 on fishery matters.

3.10. Philippines

Competent Authority: Bureau of Fisheries & Aquatic Resources: http://www.bfar.da.gov.ph.
Regulations: "Philippines Food Import Regulations": http://www.ficciagroindia.com/gov-policies/food-policy/philippines-foodimport-regulations.pdf

3.11. Russia

Competent Authority: Veterinary Department of the Ministry of Agriculture and Food of the Russian Federation: http://www.fsvps.ru/fsups/main.jsp?_language=en

Regulations: Veterinary and Sanitary Requirements for the import of Food Fish.
http://eng.usda.ru/market_access/fish/2005/03/31/125/

3.12. Singapore

Competent Authority: Agri-Food and Veterinary Authority of Singapore:
http://www.ava.gov.sg
Regulations: Wholesome Meat and Fish Act and its subsidiary legislation:
http://www.ava.gov.sg/FoodSector/ImportExportTransOfFood/Fish/index.htm

3.13. Chinese Taipei

Competent Authority: Department of Health: http://www.doh.gov.tw
Regulations: Sanitary Standard for Fishes and Shrimps:
http://food.doh.gov.tw/Chinese/Ruler/hygiene_standed_e1.asp?idcategory=128#3

3.14. Thailand

Competent Authority: Food and Drugs Authority. Ministry of Public Health.
http://www.fda.moph.go.th/eng/index.stm
Regulations: Application Procedure for Import food into Kindom Licence

3.15. United States of America

Competent Authority**:** Food and Drugs Administration (FDA)
Regulation: NSSP: Guide for Mollusks Shellfish Sanitation (Model of Ordinance).

3.16. Vietnam

3.17. Competent Authority: Ministry of Health

http://www.moh.gov.vn/homebyt/en/portal/index.jsp

4. European Union countries with specific regulations on bivalve mollusks

4.1 Introduction

The European Union (EU) is a political and economic community of twenty-seven member states located primarily in Europe. It was established in 1993 by the Treaty of Maastricht. With almost 500 million citizens the EU is generating an estimated 33% share of the world's nominal gross domestic product (US$16.6 trillion) in 2007. The EU comprises a single market created by a system of laws which apply in all member states, guaranteeing the freedom of movement of people, goods, services and capital. Fifteen member states have adopted a common currency, the euro. The EU maintains common trade and agricultural policies, and a regional development policy.

Although the Treaties are the ultimate source of EU Law, there are a number of legislative instruments available to the EU institutions. The three

main instruments are Regulations, Directives and Decisions. There is no formal hierarchy regarding the three types.

Regulations are legislative acts which become law in all member states the moment they come into force, without the requirement for any implementing measures to have been taken by member states. Once in force their contents automatically override conflicting domestic provisions, as a result of having direct effect in the national law of the member states.

Directives require member states to achieve a certain result while leaving them discretion as to how to achieve the result within a certain time period. Directives are generally used where it is thought preferable to leave the precise details of legislative implementation to national governments. Once the stated time period has passed, under certain conditions provisions within a Directive may have direct effect in national law against Member States.

Decisions offer an alternative to the two above modes of legislation. The Council and the Commission may publish in the official journal a Decision, notified to a particular addressee, such as an individual trader or a company. Decisions will be found most commonly in Competition Law, or on rulings on State Aid, and can be challenged by the addressee under certain circumstances before the EU courts.

4.2 General food trade legislation

The European Commissions' Directorate-General for the Health and Consumer Protection (SANCO) is responsible for food safety in the European Union.

Principles regarding food safety and hygiene have been established in various legal documents and particularly in recent years in Regulation N° 178/2002 which was passed in order to harmonizing food legislation to protect the consumer and install equivalent procedures of control to reach same safety results among 27 independent sovereign countries.

To ensure that imports can take place smooth and efficiently, interested countries and businesses should understand the fundamental principles and philosophy of the European Food Law, which form the basis also of the food import rules, including fishery products, in particular:

- Consumers have legitimate, high expectations regarding the safety and quality of their food to meet these expectations, the European law implements the principle of quality management and process-oriented controls throughout the entire food chain, from vessel or aquaculture farm to the consumer's table.
- To fully implement these harmonizing principles the European Authority (FVO) is currently undertaking missions in all exporting countries on the basis of bilateral arrangements.

In April 2004, the EU adopted the so-called "hygiene package" laying down new general rules for the production of all food and specific rules for products of animal origin, including fishery products and bivalve mollusks. Imported products must comply with the new rules that entered into force on January 1, 2006. The following Regulations were approved in 2004:

- **Regulation 852/2004** of the European Parliament and Council on the food hygiene of fooddtuffs *(corrigendum* published in Official Journal L *226)* establishing general requirements for primary production,technical requirements, HACCP, registrations/ approval of

food businesses, national guides of good practices (entered in force on January 2006).

- **Regulation 853/2004** of the European Parliament and Council laying down specific hygiene rules *(corrigendum* published in Official Journal L *226)* establishing specific rules for food of animal origin (bivalves mollusks included) as approval of establishments, health and identification marks, imports, food chain information (entered in force on January 2006).
- **Regulation 854/2004** of the European Parliament and the Council laying down specific rules for the organization of official controls on products of animal origin intended for human consumption (*corrigendum* published in Official Journal L *226),* establishing detailed rules for the organization of official controls on products of animal origin including, methods to verify compliance with Regulations 852/2004 y 853/2004 and Regulation 1774/2002 related to animal by-products (entered in force on January 2006)
- **Regulation 882/2004** of the European Parliament and Council on official controls performed to ensure the verification of compliance with feed and food law, animal health and animal welfare rules. The regulation lays down general rules for the performance of official controls to verify compliance with rules aiming in particular, preventing, eliminating or reducing to acceptable levels risks to humans and animals, either directly or through the environment.

Imports fishery products into the EU are subjected to official certification which is based on the recognition of the competent authority of the non-EU country by the EU Commission. This formal recognition is a prerequisite for the country to be eligible and authorized to export to the EU. Public authorities with the necessary legal powers and resources must ensure credible inspection and controls throughout the production chain which cover all relevant aspects of hygiene, public health and, in the case of aquaculture products, also animal health,

Third countries from which the EU authorizes imports of fishery products and bivalve mollusks are classified into two categories. The first category consists of the so-called "fully-harmonized" countries that have been audited by an EU inspection team and for which a specific decision has been taken under Council Directives 91/492/EEC (directive on production standards for mollusks) and 91/493/EEC (directive on production standards for fishery products). The second category consists of "pre-listed" countries whose control systems have not yet been inspected by the EU.

Although Directives 91/492/EEC and 91/493/EEC on the health conditions and placing on the market of live bivalve mollusks and fishery products have been repealed by the EU's new hygiene rules, certain implementing rules adopted on the basis of these directives still apply. Article 4, point 3 of Directive 2004/41/EC allows the continuation of certain provisions pending the adoption of the necessary provisions established by the new hygiene rules.

The U.S. is included in the list of "fully-harmonized" countries for imports into the EU of fishery products (Commission Decision 2006/200/EC). For imports of bivalve mollusks, the U.S. is included in the "pre-listed" category because it has not yet been audited by an EU inspection team.

4.3 Regulations on fishery products

For all fishery products trade, countries of origin must be on a positive list of eligible countries for the relevant product. The eligibility criteria are:

- Exporting countries must have a competent authority which is responsible for official controls throughtout the production chain. The Authorities must be empowered, structured and resourced to implement effective inspection (verification) and guarantee credible public health

and animal health attestations in the certificate to accompany fishery products that are destined to the EU.

- Live fish, their eggs and gametes intended for breeding and live bivalves mollusks must fulfill the relevant animal health standards. This requires that the Veterinary Services must ensure effective enforcement of all necessary health controls and monitoring programs
- The national authorities must also guarantee that relevant hygiene and public health requirements are met. The hygiene legislation contains specific requirements on the structure of vessels, landings sites, processing establishments and on operational processes, freezing and storage. These provisions are aiming at ensuring high standards and at preventing any contamination of the product during processing.
- Specific conditions apply to importations of live or processed bivalve's mollusks as oysters, clams, mussels or scallops and by "analogy" also to echinoderms, tunicates and marine gastropods. These imports are only permitted if they come from approved and listed production areas. The national authorities of exporting countries are required to give guarantees on the classification of these products and close monitoring of the production zones to exclude contamination with certain marine biotoxins causing shellfish poisoning.
- In the case of aquaculture products, a control plan of heavy metals, contaminants, residues of pesticides and veterinary drugs must be in place to verify the compliance with the EU requirements.
- A suitable control plan must be designed by the competent authority and submitted to the European Commission for the initial approval and yearly renewal.
- Imports are only authorized from approved vessels and establishments (as processing plants, factory vessels, cold stores), which has been inspected by the Authority of the exporting country and found to meet EU requirements. The authority provides the necessary guarantees and is obliged to carry out regular inspections to take corrective actions if necessary. A list of such approved establishments is

maintained by the European Commission and is published in the website.

4.4 Border inspections

Imports of fishery products from non-EU countries must enter the EU via an approved Border Inspection Post under the Authority of an official veterinarian. Each consignment is subjected to a systematic documentary check, identity check and as appropriate, a physical check. Consignments which are found not in compliance with Community (EU) legislation shall either be destroyed or, under certain conditions, re-dispatched within 60 days.

More information on:
http://ec.europa.eu/food/animalproducts/personal_imports/index_en.htm

4.5 *Pectinidae* trade in the European Union

There are as in other regions of globe natives species of molluscs bivalves of the family of *Pectinidae* in the Atlantic North Sea as well in the Mediterranean Sea but practically only two species are of commercial importance for the European Union market, these are: *Pecten maximus* and *Pecten jacobaeus.* It also could be considered native european the icelandic scallop (*Clamys islandica*) a scallop specie found in Canada, Iceland and, Norway but nowadays in Iceland after a period of exploitation starting in 1969 and a landing peak of more than 12 thousand tons, the stocks collapsed to figures about only 800 tons during 2000-2003.As a resulted fishing was stopped in 2004.

Pecten maximus is distributed from northern Norway down to North Africa. Extensive fisheries exist for this species around the coasts of France and UK and Ireland. *Pecten jacobaeus* is present within the Mediterranean and the Adriatic Sea and has been extensively exploited by local fisheries.

Modern fisheries for *Pecten maximus* became well established about 40 years ago and are based mainly around the British Isles and off the coast of France. Current landings in the United Kingdom are around 20, 000 t with a first sale value of nearly £ 30 M (Briggs, 2000). Scottish landings account for almost 50 % of this total (Briggs, 2000). Landings have shown a gradual decline in Europe since the late 1970s, although this partly reflects a reduction in effort by French fishermen, and French fishing grounds have a fairly critical status (Ansell *et al.*, 1991). In Shetland, for instance, scallop landings in 1969 neared 600 t but then fell to 96 t only four years later (Mason, 1983). By 1977 the catches had increased again but only to 224 t.

Pecten maximus are named with proper terms in most of the language in the European Union at least in shoreline countries as Coquille Saint Jacques (French), Vieira (Spain), King Scallop (English), Ventaglio or Capa Santa (Italian), Jakoobs-Pigermuschel or Grosse- Pigermuschel (German).

Pecten jacobaeaus are traded with the name in English as Fan Shell or Great Scallop, Vane or Coquille Saint Jacques (French), Vieira del Mediterraneo (Spanish), Capa Santa or Ventaglio (Italian) and in the same way *as P. maximus* is nominated in German.

Non natives traded especies in the UE as Chilean or Peruvian Scallop (*Argopecten purpuratus)* are named as Concha de Abanico, Veira or Ostion (Spanish), Pentocle éventail (French), Pigermuschel (German). The *Placopecten magellanicus* that also is traded in the EU is named as American scallops (English), Pecten d´America (French) or Viera americana (Spanish)

The extraction system that is used in the EU are dredges of different kind all trawled from a vessel and based on a metal frame with spines in its external side, scratching the bottom and taking the *Pectinidae* into the net.

In Europe, Spain, France, Ireland, UK and Norway have been producers of scallop from aquaculture and the production reached a peak in 1998 with 512 tonnes, but now a reduction is being presented to 213 tonnes in 2004, level which has not moved significantly.

Regarding the habits of consumption of *Pectinids*, there are three main ways as follow:

- Live shell-on (mainly *P. maximus*), distributed in production regions and in important urban centers.
- Shucked meat, chilled or frozen (IQF, Blocks, roe-on or roe-off), purchased by retailers, caterers and the processing industry.
- Preparations such a shucked meat in sauce (20-60 %) meat, the rest being sauce) sold chilled or frozen, mainly through supermarkets.

Finally it can be resumed that the main requirements or conditions to be accomplish for import operations of bivalves mollusks to EU are:

- Previous agreement of trade
- Previous plant registration and production area
- Previous recognition of competent sanitary authority
- Official health certificates.

5. Thanks by Project Overseer

On behalf of the Vice Ministry of Fisheries of Peru, I would like to express Peru's gratitude to the APEC organization for supporting project FWG 04/2008.

I would also like to express our gratitude for the support of the APEC Secretariat and co-sponsoring economies.

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Asia-Pacific
Economic Cooperation

Commercial Importance of Pectenidae Characterization within Asia Pacific Region

Harmonizing Quality and Traceability Standards for Pecten trade in Asia Pacific Region

FWG 04/2008 project
Proposed by PERU

Co-sponsoring:
CANADA & PEOPLE'S REPUBLIC OF CHINA

i. Thanks by Project Overseer

On behalf of Peru I would like to state Peru's gratitude to the APEC organization for supporting FWG 04/2008 project development.

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A. INTRODUCTION

The existence of an estimated number of more than three hundred *Pectinidae* species is recognized worldwide; among them, 160 approximately are estimated only between Japan and China. Despite this diversity of species, it is worth mentioning that only a dozen or dozen and a half species, at least, according to how these are usually declared, are recognized at an international trade level.

If we want to commercially identify this great number of species of the Family *Pectinidae* with their common names, it would cause great difficulty since these would be many, including the possibility of using more than one name for the same species. This is a totally impractical matter for international trade.

The criteria contained in the *Codex Alimentarius* standards for labeling pre-packed food considers that the name of the product "will indicate the true nature of the food, and shall be usually specific and not generic". In order to clarify the application of this principle to this case, the *Codex* indicates in the "Proposed Draft Standard for Quick Frozen Scallop Adductor Muscle Meat" that the English term *scallop* refers to the Bivalve species of the Family *Pectinidae.*

Consequently, the generic term Scallop or the respective term in other languages can be applied to any commercial product made of any species of the abovementioned Family, thus considerably reducing the trade name problem of these species of bivalve mollusks of the Family *Pectinidae*.

However, this guidance is not enough in practice as the use of an additional qualification is required in order to comply with the statutory rule that indicates that the name "shall be usually specific and not generic."

With this aim, describing each species with an additional term to the generic name in order to recognize them with accuracy is a matter required

according to regulations. These terms must accompany the generic name of Scallop (English), Vieira (Spanish), Coquille, St Jacques (French), Capa Santa (Italian), Jakobsmuschel" (German), etc. when these are used in pre-packed products for the international market as established in the *Codex* General Standard for Food Labeling.

This type of qualification is additional to that one usually applied to describe the method of product presentation (whole, roe-on, half Shell, etc.) A Codex recommendation related to the use of food properties claims is presented below as guideline to resolve the problem of so many species of "scallops".

The use of properties claims in the products labeling is undoubtedly an important mechanism for the producers, not only to comply with the statutory rules, but also as a way to present information about a series of aspects and characteristics in which the consumer has special interest, thus putting the product in a better position for a more informed or responsible consumer selection.

According to the "General Guidelines of the *Codex* on Properties Claims" (CAC/GL.1-1979 (Rev. 1. 1991), the following principles are applied to the properties claim related to food regulated or not by the *Codex*:

- *"No food shall be described or presented in a false or deceitful way, or shall create in some way a wrong impression as regards its nature on the consumer".*

- *"The person who sells the food shall be able to justify the properties claims made about it".*

- *"We understand by Properties Claims to any description that states, supposes, suggests that the food has special characteristics by origin, nutritional properties, nature, production, elaboration, composition or any other quality".*

Although many species of *Pectinidae* are easily distinguishable by characteristics such as the shape or colour of their shell, however, their identification may not be clear when presented as adductor muscle only or with gonads (roe-on or roe-off). In this situation, species identification becomes more difficult particularly for the common consumer. Take, for example, *Pecten maximus*, which is common in Spain and known for its small size and identified as Zamburiñas (usually 60-80/pound). However, these same criteria may be applied to any species in that particular market that presents itself with a similar size. The producer or distributor may incorrectly identify the species as being a *Pecten maximus* and the common consumer likely will not be able to identify that it is in fact a different species.

In order to be more specific, an additional term could be used in conjunction with the generic or common name of the species, such as “Japanese Scallop” which would refer to the country of harvest. However, these additional terms must agree with the laws, customs or practices of the country where it will be distributed, as mentioned in the “General Codex Standard for the Labeling of Prepackaged Foods”. However, so far there have not been any standards which help to guide additional terms such as harvest location, particularly when the harvest location is different from the country of sale and the species may be native to that country.

In addition to using additional term in the species description, identification can also be achieved through the use of descriptive claims. These descriptive claims could indicate unique qualities that a product may have that would be of interest to the consumer.

Discussions on applying the *Codex* standards to frozen scallops which have reached step three of the procedures process would be an ideal point to propose these types of descriptive claims. In this third step, any special characteristics that species intended for trade display, and that consumers may have an interest in knowing, may be included as “claims” that can be

used to market the product to the consumer in an effort to facilitate the consumer's choice in the marketplace.

Of all species that exist in the international trade of *Pectinidae*, many of them may be externally identifiable with certain ease by the shape, characteristics of shell and by their beautiful and incredible colors. However, if a large number of these different species of *scallops* enter, for example, into an auction market to be offered whole, their identification, despite their clear external characteristics, would present a problem for the purchasers as the same species could present a variety of colors.

The current situation in international markets is fortunately simpler since only some species are presented whole in the same market and this way, the purchasers do not have problems identifying them by their external characteristics. However, this situation is still complicated since the *scallops* are generally sold as adductor muscle only or with gonads (roe-on or roe-off). Here the species identification becomes more difficult, particularly for the common consumer. In other cases, the size of the mollusks is a factor of product nomination, for example in the case of Vieira (*Pecten maximus*) in Spain, which for small sizes is known as Zamburiñas (usually 60-80/pound); criterion that may be applied in that market to other species with similar sizes.

In order to be specific and not generic an additional qualification could be used in conjunction with the generic or common name of the species as "Japanese Scallop "or other qualification but these must agree with the laws, customs or practices of the country where it will be distributed (in accordance with "General Codex Standard for the Labeling of Prepackaged Foods").

However, so far there is not a standard that specifies, for example, when one can label a "scallop" as Australian Scallop or from another place; or in which case, a nomination, for example, as Calico from Peru could be used in a market where Calico is native.

Also the description of scallops not only can be achieved by applying names or phrases related to its origin, close to the generic name of the product, but also with the use of claims indicating that the product shows any other different quality and is of interest to the consumer, and as mentioned before, it may cover matters as “any description that states, supposes, suggests that the food has special characteristics by origin, nutritional properties, nature, production, elaboration, composition or any other quality”

The current discussion of a Codex standard for frozen scallops still on step three of the procedures would be the logical instance to propose qualifications to be applied to the particular species of scallops.

Under this consideration, this collection objective intends to identify any special characteristic that the trade species notably show, and which are supposedly of interest to the consumer; and for this reason, these may be included as “claims” in the product labeling, making them more attractive to the consumer, and thus facilitating his choice.

A. SPECIES CHARACTERIZACION

Nº 01

www.seafoodlovers.com.au/.../scallops.phtml

Scientific Name: ***Amusium balloti*** (Bernardi, 1861).

Local Name(s):	Saucer scallop.
Common English Name(s)	Southern Saucer scallop.

Nº 01	
General Characteristics	**Description**
Scientific Name: ***Amusium balloti*** (Bernardi, 1861)	
Geographic Distribution Zone	Mainly off Queensland (north of Torquay), with some in Shark Bay and southwestern Western Australia. In Western Australia, it is found around a wide area of coast between Broome and Esperance and, further south, around the Abrohos Islands.
Total Production:	Lees than 5%.
Origin (wild harvest/culture)	Natural beds: more than 95% (Australia).
Significant Figures	Commercial scallop: harvested from farms year round, and wild-caught mainly from May until December.
External Characteristics of the Shell	Not Available.
Color of Adductor Muscle	Very clear or whitish.
Average Commercial Size Presentation	9-10cm.
Commercial Presentation	Flesh with roe (commercial scallop): 20% of total weight (in half-shell), Flesh without roe (saucer scallop): 15% of total weight (in half-shell). Dried scallops are popular in many parts of Asia.
Additives Employed	None.
Water Added	Not Available.
Water Content in the Muscle	Not Available.
Aquaculture Methods	Lantern nets strung on ropes.

Nº 02

Scientific Name: ***Amusium japonicum*** (Gmelin, 1791).

Local Name(s)	Điệp bơi viền vàng (Viet Nam); Taiwanese moon scallop.
Common English Name(s)	Japanese moon scallop, Asian moon scallop; sun and moon scallop.

Nº 02	
General Characteristics	**Description**
Scientific Name: ***Amusium japonicum*** (Gmelin, 1791)	
Geographic Distribution zone	Pacific East Indian Ocean, Southern Japan, Philippines, Viet Nam.
Total Production	Not Available.
Origin (wild harvest/culture)	100% wild capture.
Significant Figures	Not Available.
External Characteristics of the Shell	The outer surface is completely smooth and glossy, while the interior has thin radial ridges. The exterior is reddish. May be used as part of the product.
Color of Adductor Muscle	Very clear or whitish.
Average Commercial Size Presentation	Not Available.
Commercial Presentation	IQF Half Shell, IQF Adductor Muscle, IQF Roe On.
Additives Employed	Not Available.
Water Content in the Muscle	Not Available.

Nº 03

Scientific Name: ***Amusium pleuronectes*** (Linne, 1758).

Local Name(s)	Skalup , Kekapis (Malaysia), Lampirong , (Philippines).
Common English Name(s)	Queensland Scallop, scallop, White Scallop, Mud Scallop, Asian Moon Scallop, Northern Saucer Scallop.

Nº 03	
General Characteristics	**Description**
Scientific Name: ***Amusium pleuronectes*** (Linne, 1758)	
Geographic Distribution Zone	Indo-West Pacific region. This includes the northern coast of Australia (northern part of Western Australia, Northern Territory and northern Queensland), Indonesia, Thailand, Malaysia, Viet Nam, southern of China, Philippines, Borneo and East Timur.
Total Production	Indonesia produced 1 470 t of scallop in 2006.
Origin (wild harvest/culture)	100% wild capture.
Significant Figures	Indonesia: 731t (2004); 1 404t (2005) and 1 470t (2006).
External Characteristics of the Shell	Maximum size of 100 mm. The shell is thin and medium sized (commonly attaining 8 cm in length). Almost round, flat shells, the top being distinctively smooth with concentric circular bands of browny reds, darker towards the outside edge.
Color of Adductor Muscle	The flesh is white to cream when raw and white when cooked. The roe varies from white to orange or pinkish purple depending on species and condition.
Average Commercial Size Presentation	The meat averages 13g. The shell can grow to 14cm in length, with Northern generally around 8cm.
Commercial Presentation	9 cm southern and 8 cm northern, muscle IQF, roe off with mantle. IQF Half Shell, IQF Adductor Muscle, IQF Roe- On.
Additives Employed	Not Available.
Water Content in the Muscle	Not Available.
Aquaculture Methods	Wild spat and suspended culture.

Nº 4

Scientific Name: ***Annachlamys flabellata*** (Lamarck, 1819).

Local Name(s):	Not available.
Common English Name(s)	Fan Scallop.

Nº 4	
General Characteristics	**Description**
Scientific Name: ***Annachlamys flabellata*** (Lamarck, 1819).	
Geographic Distribution Zone	Found in northern Australia and is harvested mainly by recreational fishermen. It also occurs throughout the western Pacific Ocean from Indonesia to New Caledonia.
Seller Country	Philippines.
Local Name(s)	Not Available.
Common English Name(s)	Fan scallop.
Activity of Origin	Culture: Less than 5%. Are caught using a harvester (dredge) or by trawling.
Significant Figures	Not Available.
External Characteristics of the Shell	Not Available.
Color of Adductor Muscle	Not Available.
Average Commercial Size Presentation	10cm.
Commercial Presentation	Frozen whole, shell-on; frozen meat IQF (meat and roe); and frozen meat bulk (meat and roe), and frozen meat without roe.
Additives Employed	Not Available.
Water Added	Not Available.

Nº 05

Scientific Name: ***Argopecten irradians*** (Lamarck, 1819)

Local Name(s)	Tikab, kabebe (Philippines), เปลือกหอยพัด bplèuak hŏi pát (Thailand).
Common English Nam(e)	China Bay Scallop.

Nº 05	
General Characteristics	**Description**
Scientific Name: ***Argopecten irradians*** (Lamarck, 1819)	
Geographic Distribution Zone	Northern China (introduced from North America); North America (Atlantic Region) Thailand and Philippines.
Total Production	China 200 000t, USA (true bay scallop) 60 000t.
Origin (wild harvest/culture)	Traditional from wild capture, China 100% from culture.
Significant Figures	China: 500-600 x 10^3t. Yield 10-12% (8-10/1).
External Characteristics of the Shell	Shell colour ranges from gray to yellow or reddish brown. Color may be used as part of the product.
Color of adductor Muscle	Very clear or whitish depending on the origin. Sweet taste.
Average Commercial Size Presentation	Average: 80/120 pieces per pound roe off.
Commercial Presentation	IQF Adductor Muscle, dried adductor muscle or blocks. Smoked, marinated and freeze-dried.
Additives Employed	Iodate and salt water.
Water Content in the Muscle	General average: 78, Normal range: from 75 to 80
Aquaculture Methods	Suspending culture (off-bottom). All seeds are hatchery-produced.

Nº 06

Scientific Name: ***Argopecten purpuratus*** (Lamarck, 1819).

Local Name(s)	French: Pétoncle éventail. Spanish: Concha de abanico, Vieira, Ostión del Norte. German: Pilgermusche.
Common English Name(s)	Peruvian Vieira, Zamburiña, Coquille S't Jacques, Peruvian Calico, Northern scallop.

Nº 06	
General Characteristics	**Description**
Scientific Name: ***Argopecten purpuratus*** (Lamarck, 1819)	
Geographic Distribution Zone	From 5 °35S (Peru) to 30°S (Chile) on the west coast of South America. Between 7 and 40m deep.
Activity of Origin	Culture and recollection by diving. Mostly from aquaculture.
Significant Figures	Peru: from culture 11 294t (2008), 18 518 (2007), 12 337 (2006), 11 065 (2005). Chile 2 600 (2004). Peru: from caught 24 768 (2007), 18 763 (2006), 9630 (Jan.-Jul. 2008).
External Characteristics of the Shell	65mm to 150mm. May be used as part of some product presentations (1/2 shell).
Color of Adductor Muscle	Clear or whitish/ light pink.
Average Commercial Size Presentation	10/20, 20/30, 20/30 pieces/pound.
Commercial Presentation	IQF Adductor Muscle, IQF roe-on, IQF Half Shell, and half valve roe-on, frozen blocks.
Additives Employed	Polyphosphates or glucose solutions.
Water Content in the Muscle	Average is 75-79%.
Aquaculture Methods	Suspended and bottom culture and hatchery.

Nº 07

www.jaxshells.org/617c.jpg

Scientific Name: ***Argopecten ventricosus*** (Sowerby II, 1842).

Local Name(s)	Almeja Catarina, Catarina Sallop.
Common English Name(s)	Calico scallop.

Nº 07	
General Characteristics	**Description**
Scientific Name: ***Argopecten ventricosus*** (Sowerby II, 1842)	
Geographic Distribution Zone	From Baja California (Mexico) to Paita Peru, concentrated between 12 and 30m deep, although it has been found up to 180m deep into the continental platform of Baja California.
Presence of Species	Magdalena Bay, and ocassionaly in Concepcion Bay
Activity of Origin	Wild capture. Natural beds are shallow (95% <20 m).
Significant Figures	On average 1 500t of meats during the last 5 years.
External Characteristics of the Shell	Valve of medium to large size, solid, sturdy, somewhat obliquely, very convex. Slightly longer than high. Maximum height: 70mm.
Color of Adductor Muscle	Clear or whitish/ivory.
Average Commercial Size Presentation	75-100 counts per pound.
Commercial Presentation	IQF meats; Block frozen meats
Additives Employed	None*
Water Added	None*
Aquaculture Methods	Suspended and bottom. (Mexico). Supply of Seed: Natural Grooming. Artificial Production (Hatchery).
* No treatment is given in Mexico	

Nº 08

Scientific Name: ***Chlamys behringiana*** (Middendorff, 1849).

Local Name(s)	Not Available.
Common English Name(s)	Bering Sea's Scallop.

Nº 08	
General Characteristics	**Description**
Scientific Name: ***Chlamys behringiana*** (Middendorff, 1849)	
Geographic Distribution Zone	The North Pacific Ocean: Sea of Okhotsk - Sakhalin and Aniva Bays, Strait of Laperuz, southern and eastern waters of Kamchatka Peninsula, Kurile Islands (Paramushir and Shikotan).
Presence of Species :	Not Available.
Origin (wild harvest/culture)	Wild capture.
Significant Figures	Not Available.
External Characteristics of the Shell	Almost round and of clear brown colour.
Color of Adductor Muscle	The sweet-flavored muscle is the only part of the scallop that is typically found in markets and served in dining establishments.
Average Commercial Size Presentation	62mm.
Commercial Presentation	Not Available.
Additives Employed	Not Available.
Water Added	Not Available.
Aquaculture Methods	Not Available.

Nº 09

Scientific Name: ***Chlamys delicatula*** *(*Hutton, 1873).

Local Name(s)	Not Available.
Common English Name(s)	Southern Queen Scallop.

Nº 09	
General Characteristics	**Description**
Scientific Name: ***Chlamys delicatula*** *(*Hutton, 1873).	
Geographic Distribution Zone	It is captured in the southern waters of New Zealand from South Canterbury to Stewart Island and around and offshore the islands and from the Snares to as far south as MacQuarie Island. The species is found at depths of 130-200m, but is most common between 100 and 150m.
Origin	Native.
Activity of Origin	100% wild capture.
Significant Figures	Not available.
External Characteristics of the Shell	The common Shell width is 6-8cm and they are available all year round. May be used as part of the product.
Color of Adductor Muscle	Very clear or whitish (white).
Average Commercial Size Presentation	36-38 pieces/kg.
Commercial Presentation	IQF adductor muscle roe-off and roe-on, Scallop meat.
Additives Employed	None.
Water Content in the Muscle	Not Available.

Nº 10

Scientific Name: ***Chlamys farreri*** (Jones & Preston, 1904)

Local Name(s)	Zhikong Scallop, Akazarakai.
Denominations in the International Market.	China Scallop.

Nº 10	
General Characteristics	**Description**
Scientific Name: ***Chlamys farreri*** (Jones & Preston, 1904)	
Geographic Distribution Zone	Northern coastal waters of China, Korea and Japan.
Total Production	In China about 200 000t yearly.
Origin (wild harvest and culture)	Wild capture 10-20%. Cultured: 80-90%.
Significant Figures	China (2003-2007): 100-460x10^3t.
External Characteristics of the Shell	Brown reddish nice colour.
Color of Adductor Muscle	Very clear or whitish.
Average Commercial Size	15-25 pieces/kg. Average 20 pieces.
Commercial Presentation	IQF muscle adductor, Frozen whole, and prepared food also dried adductor muscle.
Additives Employed	Not in IQF products.
Water Added	Not Available.
Water Content in the Muscle	Not Available.
Aquaculture Methods	Suspending culture (off-bottom). Part of seeds is hatchery-produced and the remaining part is naturally produced.

Nº 11

www.wallawalla.edu/.../Chlamys_hastata.html

Scientific Name: ***Chlamys hastata*** (Sowerby II, 1842).

Local Name(s)	Not Available.
Common English Name(s)	Spiny Scallop, The Pacific Pink Scallop, and the Swimming Scallop.

Nº 11	
General Characteristics	**Description**
Scientific Name: ***Chlamys hastata*** (Sowerby II, 1842)	
Geographic Distribution Zone	Widely found in the west coast of North America. It Is found from 33°N - 60°N, in San Diego, California to the Gulf of Alaska.
Presence of Species	Not Available.
Activity of Origin	100% wild capture. Using two different harvest techniques: a dive fishery and a trawl fishery.
Significant Figures of Production in the Last Years	Studies with pink and spiny scallops considered they are too small and they growth too slow to support an economically viable culture operation.
External Characteristics of the Shell	Is usually pink to yellow, and often streaked. Maximum shell height is of 80mm.
Color of Adductor Muscle	Colored.
Average Commercial Size Presentation	Not Available.
Commercial Presentation	IQF Adductor Muscle, Block Frozen Adductor Muscle.
Additives Employed	None.
Water Added	None.

Nº 12

Scientific Name: ***Chlamys spp.*** (Sowerby II, 1842).

Local Name(s)	Not Available.
Common English Name(s)	Not Available.

Nº 12	
General Characteristics	**Description**
Scientific Name: ***Chlamy spp.*** (Sowerby II, 1842)	
Geographic Distribution Zone	Philipines.
Presence of Species	Not Available
Local Name(s)	Not Available.
Common English Name(s)	Spiny scallop, the Pacific Pink scallop, and Swimming scallop.
Activity of Origin	Natural beds: 100%
Significant Figures	Malaysia: Only incidental to trawl fishing so volume highly variable. Philippines: One (1) to <10t at a time shell on basis depending on stock availability.
External Characteristics of the Shell	Color may be used as part of the product.
Color of Adductor Muscle	Colored: Creamy Yellow.
Average Commercial Size Presentation	Number of pieces per kg: average 300 Range: <200 to 500
Commercial Presentation	IQF Adductor Muscle, Block Frozen Adductor Muscle.
Additives Employed	None.
Water Added	None.
Aquaculture Methods	Natural Spat collection. Hatchery still beginning.

Nº 13

Scientific Name: ***Chlamys nobilis*** (Reeve, 1852).

Local Name(s)	Huaigui Zhikong (China) Diep quat (Viet Nam), Điệp quạt (native name).
Common English Name(s)	Zhikong Scallop, Noble Scallop.

Nº 13	
General Characteristics	**Description**
Scientific Name: ***Chlamys nobilis*** (Reeve, 1852).	
Geographic Distribution Zone	It is widely distributed in the coastal waters of the east China and south China seas, the Honshu, Shikoku and Kyushu coastal waters of Japan and Indonesian Waters.
Total Production	Not Available
Origin (wild harvest/culture)	100% from aquaculture in China.
Significant Figures	In Viet Nam aquaculture has been initiated.
External Characteristics of the Shell	Color may be used as a part of the product.
Color of Adductor Muscle	Very clear or whitish.
Average Commercial Size	China 15-25/kg. Viet Nam: average 300/kg.
Commercial Presentation	Adductor muscle IQF, roe-on on half shell and also dried muscle.
Additives Employed	None.
Water Content in the Muscle Under Normal Processing	General average: 77.5% Normal range: from75% to 80%.
Aquaculture Methods	Suspending culture (off-bottom). All seeds are hatchery-produced.

Nº 14

www.wallawalla.edu/.../Chlamys_rubida.html

Scientific Name: ***Chlamys rubida*** (Hinds, 1845).

Local Name(s)	Not Available
Common English Name(s)	Pink Scallop, Smooth Pink Scallop, Reddish Scallop, and Swimming Scallop.

Nº 14	
General Characteristics	**Description**
Scientific Name: ***Chlamys rubida*** (Hinds, 1845)	
Geographic Distribution Zone	Are widely found oin the west coast of North America. Pink scallops are found from 33°N - 58°N, in San Diego, California to Kodiak Island, Alaska.
Presence of Species	Not Available.
Activity of Origin	The fishery was confined to inshore waters using two different harvest techniques: a dive fishery and a trawl fishery.
Significant Figures	Not Available.
External Characteristics of the Shell	Not Available.
Color of Adductor Muscle	Not Available.
Average Commercial Size Presentation	Not Available.
Commercial Presentation	Fresh or frozen.
Additives Employed	Not Available.
Water Added	Not Available.
Aquaculture Methods	Not Available.

Nº 15

Scientific Name: ***Chlamys vitrea*** (King & Broderip, 1831).

Local Name(s)	*Ostión del Sur o de Ventisquero.*
Common English Name(s)	Southern Scallop.

Nº 15	
General Characteristics	**Description**
Scientific Name: ***Chlamys vitrea*** (King & Broderip, 1831).	
Geographic Distribution Zone	Southern tip of coast of Chile in the region of Magallanes. Range between 2 and 17 m deep. Lives in the shallower parts of fjords, closely related to glaciers, between 48°S and 55° S.
Presence of Species	Not Available.
Activity of Origin	Is drawn exclusively from the existing natural banks at the southern tip of the country.
Significant Figures	The technology only allows upbringing its crops as an experiment.
External Characteristics of the Shell	Is translucent whitish or orange in individuals up to 50mm shell height, later on the shell increases in height and convexity, as well as thickness, attaining a dark brown or violet colour, even in the interior of the valves.
Color of Adductor Muscle	Clear.
Average Commercial Size Presentation	40/50 pieces/pound.
Commercial Presentation	Quick Frozen (I.Q.F.) meats.
Additives Employed	Not Available.
Water Added	Not Available.
Aquaculture Methods	Suspended and bottom culture (experimental).

Nº 16

Scientific Name: ***Equichlamys bifrons*****,** also called ***Chlamys bifrons*** (Lamarck, 1819).

Local Name(s)	Not Available.
Common English Name(s)	Queen Scallop.

Nº 16	
General Characteristics	**Description**
Scientific Name: ***Equichlamys bifrons,*** also called ***Chlamys bifrons*** (Lamarck, 1819).	
Geographic Distribution Zone	Found in southern [illegible]s, Victoria, Tasmania and South Australia).
Presence of Species	Not Available.
Activity of Origin	Not Available.
Significant Figures	Not Available.
External Characteristics of the Shell	62, 63mm. Great dark purple-brown interior and ribs accented by purple rays.
Color of Adductor Muscle	Not Available.
Average Commercial size Presentation	Not Available.
Commercial Presentation	Not Available.
Additives Employed	Not Available.
Water Added	Not Available.

Nº 17

Scientific Name: ***Mimachlamys or Chlamys asperrima.***

Local Name(s)	Doughboy Scallop also known as Sponge Scallops.
Common English Name(s)	Doughboy Scallop, Minamino-nishiki, Sponge Scallop.

Nº 17	
General Characteristics	**Description**
Scientific Name: ***Mimachlamys or Chlamys asperrima***	
Geographic Distribution Zone	South Australia found off the southern coast and caught in Bass Strait, Jervis Bay and South Australia.
Origin	Native.
Activity of Origin	Wild fishery.
Significant Figures	Not Available
External Characteristics of the Shell	58 to 62mm. Typical orange/brown colour form with finely spined. It seems a sponge.
Color of Adductor Muscle	Clear.
Average Commercial Size Presentation	Not Available.
Commercial Presentation	Not Available.
Additives Employed	Not Available.
Water Content in the Muscle	Not Available.

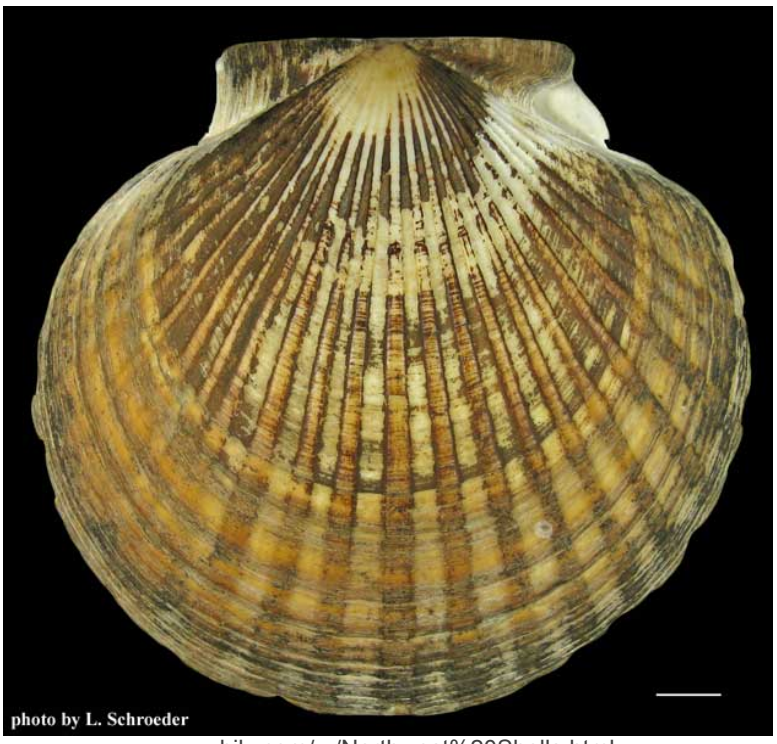
Nº 18

Scientific Name: ***Nodipecten subnodosus*** (Sowerby, 1835).

Local Name(s)	Almeja Mano de Leon, Almeja Garra de León.
Common English Name(s)	Lion's Paw Sallop, Pacific Lion´s Paw Scallop.

Nº 18	
General Characteristics	**Description**
Scientific Name: ***Nodipecten subnodosus*** (Sowerby, 1835).	
Geographic Distribution Zone	From Baja California (Mexico) to Paita Peru.
Presence of Species	Ojo de Liebre Lagoon is the only place where a fishery of this species exists. (Baja California).
Activity of Origin	Natural beds are shallow (<20 m).
Significant Figures	On average, 220 t of meats during the last five years.
External Characteristics of the Shell	The shell is very big, strong, thick, convex, compressed and quite solid, the largest species of tropical America and heavy, longer than high. Maximum height: 170mm.
Color of Adductor Muscle	Clear or whitish/ivory, light pink.
Average Commercial Size	5 counts per pound.
Commercial presentation	Quick Frozen (I.Q.F.) meats, Fresh meats, Frozen Block meats. Whole frozen, Whole live (on trial).
Additives Employed	Iodate salt, citric acid and water.
Water Added	Not Available.
Aquaculture Methods	Suspended and bottom culture (experimental). Spat production in hatcheries.

Nº 19



www.bily.com/.../Northwest%20Shells.html

Scientific Name: ***Patinopecten caurinus*** (Gould, 1850).

Local Name(s)	Not Available
Common English Name(s)	Weathervane Scallop.

Nº 19	
General Characteristics	**Description**
Scientific Name: ***Patinopecten caurinus*** (Gould, 1850).	
Geographic Distribution Zone	From California (37°N) to the northern part of the Gulf of Alaska (60° N), west from the Aleutian Islands to Amlia Island (53°N 174°W) and into the Bering Sea on Petral Bank in depths of 10-300m.
Presence of Species	Not Available.
Activity of Origin	In Alaska a fishery occurs on many small beds scattered throughout the vast coastal waters of the southern part of the State but mainly in the Yakutat, Kodiak Island and Dutch Harbour areas.
Significant Figures	Not Available.
External Characteristics of the Shell	Shell size of 250 mm, the lower right valve is large and more convex than the left and the external colour is yellowish-white to light brown.
Color of Adductor Muscle	Not Available.
Average Commercial Size Presentation	Not Available.
Commercial Presentation	Not Available.
Additives Employed	Not Available.
Water Added	Not Available.
Aquaculture Methods	Not Available.

Nº 20

Scientific Name: ***Patinopecten yessoensis + Patinopecten caurinus.***

Local Name(s)	Not Available.
Common English Name(s)	Pacific Scallop.

Nº 20	
General Characteristics	**Description**
Scientific Name: **Pacific Scallop *(Patinopecten yessoensis + Patinopecten caurinus).***	
Geographic Distribution Zone	Hybrid scallop originally created by crossing a Japanese import (*Patinopecten yessoensis*) with local Weathervane scallops (*Patinopecten caurinus*).
Presence of Species	Not Available.
Activity of Origin	Minor landings (less than 1t annually) reported from California are from aquaculture operations. Rock scallops are harvested in recreational fisheries along the coast and the catch is regulated by daily harvest limits.
Significant Figures	From 2000 to 2006 were recorded landing of Weathervane scallops in the west coast of USA about 1 200t, but not reported production of scallops from aquaculture.
External Characteristics of the Shell	Not Available
Color of Adductor Muscle	Not Available.
Average Commercial Size Presentation	Reach sizes of 15cm.
Commercial Presentation	Live scallops: extra small, small, medium and large.
Additives Employed	Not Available.
Water Added	Not Available.
Aquaculture Methods	Suspended culture.

Nº 21

shell.kwansei.ac.jp/.../data05/m301.html

Scientific Name: ***Patinopecten (Mizuhopecten) yessoensis.***

Local Name(s)	Hotate-kai (Japan), Xiayi (China), Garibi (Korea).
Common English Name(s)	Japanese Scallop, Yesso Scallop.

Nº 21	
General Characteristics	**Description**
Scientific Name: ***Patinopecten (Mizuhopecten) yessoensis*** 	
Geographic Distribution Zone	North part of Japan and the far-east region of Russia Also cultivated in Liaoning and Shandong province of China. Originally introduced from Japan. Also production in minor quantities in Russia and Korea.
Total Production	Close to 1.35 million t (FAO 2006). Yield 8:1 to meat approximately.
Origin (wild harvest/culture)	60-70% from natural beds. 30-40% from aquaculture.
Significant Figures	Japan (2006) capture 271 928t and from culture 212 094t. China (2007) 200 000t.
External Characteristics of the Shell	>12mm heigh. May be used as part of the product. Size: 5-8 pieces/kg (whole).
Color of Adductor Muscle	Very clear or whitish, also redish.
Average Commercial Size Presentation	20-30/pound.
Commercial Presentation	IQF, Whole frozen body, On the half shell.
Additives Employed	In China no additives are allowed on fresh or frozen scallops.
Water Added	Not Available.
Water Content in the Muscle	General average 79.5 %. Range 79-80%.
Aquaculture Methods	Bottom. Part of seeds is hatchery-produced and the remaining part is naturally produced.

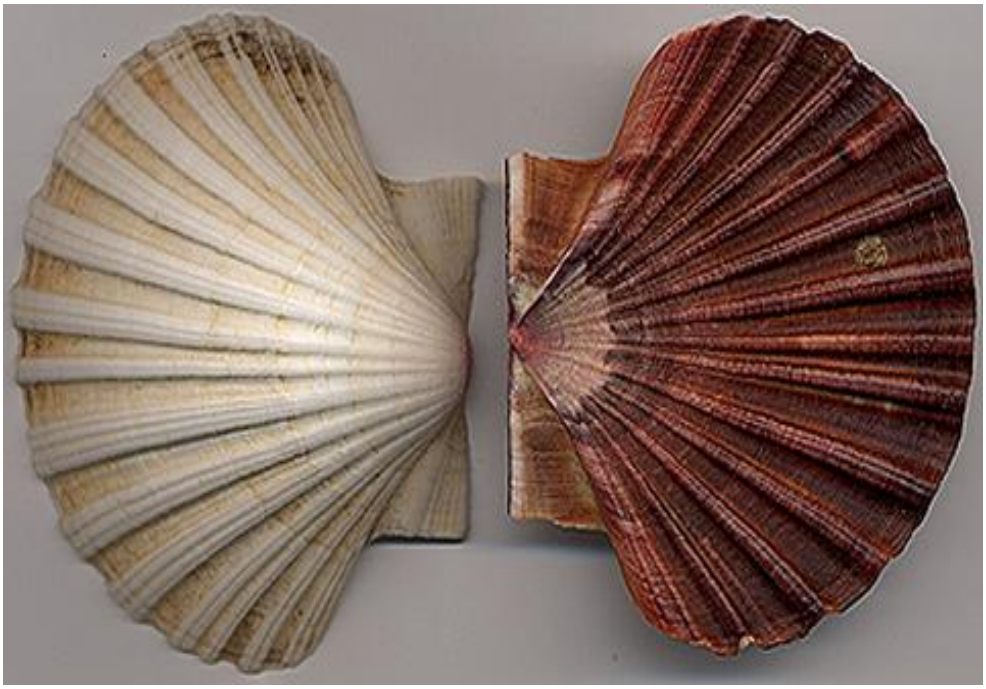
Nº 22

Scientific Name: ***Pecten fumatus*** (Reeve, 1852).

Local Name(s)	Not Available.
Common English Name(s)	King/commercial Scallop, Southern Scallop and Tasmanian Scallop.

Nº 22	
General Characteristics	**Description**
Scientific Name: ***Pecten fumatus*** (Reeve, 1852).	
Geographic Distribution Zone	Along the coast of southeast Australia from central New South Wales through Victoria to South Australia and around Tasmania (populations are found in Port Phillip Bay (Victoria), Jervis Bay (New South Wales) and Coffin Bay (South Australia) as well as more exposed coastal waters).
Origin	Native.
Total Production	Not Available.
Activity of Origin	Wild caught and farmed. Harvested by dredging or diving.
Significant Figures	Not Available.
External Characteristics of the Shell	Maximum length of over 14 cm. but are commonly found between 8 to 9 cm in length. It is distinguished from other scallops by having equal-sized, circular shaped shells that are thin but trengthened by radiating ribs. The upper valve is flat, whilst the lower valve is deeply convex.
Color of Adductor Muscle	Very clear or whitish.
Average Commercial Size Presentation	Average 38 Range: 36-40
Commercial Presentation	IQF adductor muscle roe-off and roe-on, Frozen whole, shell on; scallop on half shell; scallop meat.
Additives Employed	None.
Water Content in the Muscle	Not Available.
Aquaculture Methods	Lantern nets strung on ropes.

Nº 23



Scientific Name**:** ***Pecten jacobaeus*** (Linne, 1758).

Local Name(s)	French: Vane, Coquille Saint Jacques. Spanish: Vieira del Mediterráneo. Italian: Ventaglio, Capa Santa. German: Jakoobs-Pilgermuschel, Grosse Kammuschel.
Common English Name(s)	Fan Shell, Great Scallops.

Nº 23	
General Characteristics	**Description**
Scientific Name: ***Pecten jacobaeus*** (Linne, 1758).	
Geographic Distribution Zone	Mediterranean and the Adriatic Sea. It is found from 25 to 190 m depth, but can reach 250m.
Activity of Origin	100 % wild capture (EU).
Significant Figures	Aquaculture of Pectinids in the EU suffered a period of growth in the middle of the 90, but, at this moment, it is a residual activity that hardly represents regarding the total amount of commercialized pectinids.
External Characteristics of the Shell	85 mm. It is red-brown exterior with colour patterns often vary the white right valve; white interior, often tinged with reddish-brown on the periphery.
Color of Adductor Muscle	Very clear or whitish.
Average Commercial Size Presentation	Not Available.
Commercial Presentation	IQF adductor muscle roe-off and roe-on. Scallop meat. Half shell with meat and roe on/off, chilled or frozen.
Additives Employed	Polyphosphates or glucose solutions in frozen (EU.)
Water Content in the Adductor Muscle	General average: 70%. Normal Range: from 60 to 80%.

Nº 24

Scientific Name: ***Pecten maximus*** (Linnaeus, 1758).

Local Name(s)	French: Coquille Saint Jacques. Spanish: Vieira. Italian: Ventaglio, Capa Santa. German: Jakoobs-Pilgermuschel, Grosse Pilgermuschel.
Common English Name(s)	Giant scallop, King scallops. In Spain two denomination according size: Vieira, less than 20 pieces per pound and, Zanburiña more than 40 as a roe on meat.

Nº 24	
General Characteristics	**Description**
Scientific Name: ***Pecten maximus*** (Linnaeus, 1758).	
Geographic Distribution Zone	Occurs along the European Atlantic coast from northern Norway, south to the Iberian Peninsula and has also been reported off West Africa, the Azores, Canary Islands and Madeira (Brand 2006b).
Total Production	Europe, Spain, France, Ireland, UK and Norway the aquaculture production reached a peak in 1998 with 512 t followed by a reduction to 213 t in 2004.
Activity of Origin	100 % wild capture.
Significant Figures	Not Available.
External Characteristics of the Shell	Solid shell up to 15cm in length. The valve is flat and red brown in colour. The right is convex and white or cream in colour. The inside of both valves is white. The surface is sculptured with prominent radiating ribs and finer concentric lines. Upper valve flat; lower one convex Both valves have 15 to 17 radiating ribs.
Color of Adductor Muscle	Very clear or whitish.
Commercial Presentation	France: Whole and Half shell only fresh and roe on, frozen Live shell-on.
Additives Employed	Polyphosphates or glucose solutions in frozen.
Water Content in the Adductor Muscle	France: has restriction over maximum contented of humidity in the muscle (80%).

Nº 25

Scientific Name: ***Pecten novaezealandiae.***

Local Name(s)	Tupa (Maori name).
Common English Name(s)	New Zealand Scallop, Grote mantel (The Netherlands), Kamm-Muschel (Germany), Ctent (Greece), Ventaglio (Italy), Hotatega (Japan) and Vieira (Spain).

Nº 25	
General Characteristics	**Description**
Scientific Name: ***Pecten novaezealandiae.***	
Geographic Distribution Zone	In New Zealand is found around the coast in sandbanks and mudbanks of sheltered bays from the low tide mark out to about 50 metres depth.
Presence of Species	Not Available.
Activity of Origin	100% wild capture. 1,981t in 2004, rose to 2,772t in 2005 and then fell.
Significant Figures	No scallop culture in New Zealand.
External Characteristics of the Shell	May be used as part of the product.
Color of Adductor Muscle	Very clear or whitish.
Average Commercial Size Presentation	Number of pieces per kg: Average 38 Range:36-40.
Commercial Presentation	IQF adductor muscle roe-off and roe-on. Scallop meat.
Additives Employed	None.
Water Content in the Muscle	Not Available.

Nº 26

Scientific Name: ***Placopecten magellanicus*** (Gmelin, 1791)

Local Name(s)	French: Pecten d'Amérique. Spanish: Vieira Americana.
Common English Name(s)	American Ssea scallop, Giant sea scallop.

Nº 26	
General Characteristics	**Description**
Scientific Name: ***Placopecten magellanicus*** (Gmelin, 1791)	
Geographic Distribution Zone	The continental shelf of the northwest Atlantic from the north shore of the Gulf of St. Lawrence south to Cape Hatteras, North Carolina . Also the species has been found in the Mediterranean on sandy substrates, down to 100 m.
Presence of Species	Native.
Activity of Origin	Is caught in the Northwest Atlantic, both in the U.S. and in Canada. Usually fished with dredges and are cultured too.
Significant Figures	
External Characteristics of the Shell	Large, subcircular, and compressed. Reddish-brown in colour but maybe lavender or yellow; and pale cream or white.
Color of Adductor Muscle	The adductor muscle scar is to the centre of the valves and is slightly larger on the left valve.
Average Commercial Size Presentation	Not Available
Commercial Presentation	The traditional market for wild-caught scallops is as shucked meats, which may be sold fresh or frozen.
Additives Employed	Polyphosphates or glucose Solutions.
Water Added	Average is 70% while normal range fluctuates from 60 to 80%.
Aquaculture Methods	Hanging culture, bottom culture and bottom ranching.

Nº 27

Scientific Name: ***Zygochlamys patagonica*** (King & Broderip, 1832)

Local Name(s)	Espanish: Vieira Patagónica.
Common English Name(s)	Patagonian Scallop; "Southern scallop"

Nº 27	
General Characteristics	**Description**
Scientific Name: ***Zygochlamys patagonica*** (King & Broderip, 1832).	
Geographic Distribution Zone	Around the South America. Its range covers the Chilean coast from Puerto Montt to Tierra del Fuego, the Patagonian shelf up to the estuary of the Rio de la Plata, the Falkland Islands shelf, and the Burdwood Bank.
Presence of Species	Not Available
Activity of Origin	100 % wild capture. In Chile it is drawn exclusively from the existing natural banks from the southern tip of the country in the region of Magallanes.
Significant Figures	Not Available
External Characteristics of the Shell	May be used as part of the product.
Color of Adductor Muscle	Very clear or whitish.
Average Commercial Size Presentation	Meat Roe-on: Average 17, Range: 10-20, Average 25. Range: 20-30, Average 35. Range: 30-40, Average 50. Range: 40-60, Average 70. Range: 60-80. Smaller sizes are rarely produced. Meat Roe off: Average 27. Range: 20-30. Average 37. Range: 30-40, Average 47. Range: 40-50 or 50+ Half shell = size in cm over 60mm.
Commercial Presentation	Half shell with meat and roe on/off, chilled or frozen.
Additives Employed	Polyphosphates or glucose solutions in frozen.
Water Added	Not Available.
Water Content in the Adductor Muscle	General average: 70%. Normal Range: from 60 to 80%.