Import risk assessment for salmon meat

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Summary: The authors discuss the risk assessment currently being conducted by the Australian Quarantine and Inspection Service (AQIS) on the importation of salmon products.

AQIS conducted a public consultation on the proposal, in line with Australian Government policy on transparency and accountability in the quarantine decision-making process.

The authors examine the factors which should be taken into account in the assessment of the risk associated with the importation of such products, and note the difficulties encountered with the epidemiology of fish diseases.


INTRODUCTION

Australia is free of most of the major diseases of salmonid fish, including bacterial kidney disease, infectious haematopoietic necrosis, viral haemorrhagic septicaemia and infectious pancreatic necrosis. Some biotypes of the bacteria *Aeromonas salmonicida* and *Yersinia ruckeri* are found in Australia. The salmonid fish family is not native to the country; the first species were introduced in the 1860s and the latest genetic material arrived in 1966.

Australia has a developing salmonid aquaculture industry which regards the health status of salmon as a major asset, because of the resultant freedom from major production losses due to disease and the consequent reduction in the requirement to use chemicals. Recreational fishing groups are also aware that Australia has a major resource to protect and are concerned that relaxed importation requirements may lead to the introduction of diseases which affect the introduced salmonid species and possibly also rare or endangered native fish species. In order to protect this disease status, Australia imposes strict requirements on the entry of salmonid products. Commercially-canned salmon products are allowed free entry, but products which have not been canned must be subjected to a heating or “smoking” process.

Australia has received several access requests for uncooked salmonid products, and domestic interests have asked that the heating (“smoking”) requirements for uncanned salmon products be reviewed, as experimental evidence indicates that the present requirements are not adequate to ensure inactivation of salmonid pathogens (1) and therefore represent an unacceptable risk.

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RISK ASSESSMENT MODEL

The Australian Quarantine and Inspection Service (AQIS) has been attempting to address these questions by developing a model which describes the major paths by which salmonid diseases could be introduced into Australia with imported products. The model is aimed at making the risk assessment process more transparent and accountable, in line with Australian Government policy (2).

There are considerable difficulties with this approach in aquatic animals, as much detailed information regarding the epidemiology of the diseases is unknown or poorly documented, and must therefore be estimated. In particular, data on what constitutes an infective dose, the influence of the environment on the development of disease and the difficulties in detecting latent infection in animals are significant.

However, AQIS believes that it is still worthwhile pursuing the development of a model to describe the risks of disease introduction through salmonid fish. Such a model would more clearly focus debate on the issues and encourage more disciplined comments on import proposals, as particular concerns would be seen in the context of the entire model and not as fatal flaws in the procedure. It should be possible to determine which factors are significant in the importation chain and which treatments are the most effective in reducing risk. It is essential that accurate data are used, as they have a significant effect on the calculation of the overall risk.

The model which AQIS has been developing uses a computer spreadsheet and the programme @Risk (Palisade Corporation, Newfield, New York, United States of America). The initial model has been developed to examine the importation of salmon products from aquaculture establishments. A flow path has been designed, taking into account the following distinct stages in the risk model:

- the prevalence of infected fish on the farm of origin
- risk reduction as a result of processing and risk of cross-infection during processing in the exporting country
- further risk reduction by processing/consumption in Australia
- the risk of disposal of unused products or contaminated materials
- the risk of infecting Australian animals
- the volume of imported material.

Prevalence of infected fish on the farm of origin

The factors requiring consideration include the following: the presence of the disease in the country of origin; the monitoring programme used in the country of origin; the sensitivity of on-farm surveillance; monitoring and testing regimes; the presence of the disease in the water source; restocking or release of recreational, food or other types of fish into the water source; measures used in the introduction of new genetic material onto the farm; and security of the farm against the introduction of disease by wild fish, fishermen or birds.

Restrictions may also be placed on the species of fish accepted for import, as some species are more susceptible than others to infection with certain disease agents.
Risk reduction as a result of processing and risk of cross-infection during processing in the exporting country

The level of infection among fish on the farm of origin may be low or nil; however, there is a risk that this level could be altered by the substitution of products from other sources or contamination by other products which are processed at the same time in the same factory. The procedures and safeguards practised in the processing plant may mitigate against such problems.

Processing may reduce the risk of contaminated products being exported (through quality control procedures which are used to discard diseased fish), or reduce the level of contamination (through such processes as the removal of the visceral organs, in which disease agents may be present, and washing of the product to reduce gross surface contamination from these visceral organs). The storage and transport of products may cause a reduction in the numbers of viable organisms.

Further risk reduction by processing/consumption in Australia

The product is being imported for human consumption. Consumption of all imports by humans can be regarded as removing the risk of disease transmission to other fish. Prior to consumption, the product may be cooked, which will reduce the risk of contamination. Concern therefore relates to a product which is inadequately cooked before disposal, and the means of disposal.

Risk of disposal of unused products or contaminated materials

There are several avenues by which infective material could have access to susceptible species. It is not uncommon for recreational fishermen to use fish products to attract fish while fishing, and picnickers may directly dispose of products into watercourses. Some material would end up as kitchen waste, which is washed away and undergoes various degrees of wastewater treatment prior to discharge.

Some of the product will be used in areas where there are no susceptible hosts, or will be discharged into the wrong environment (marine vs freshwater).

Risk of infection in Australian animals

The susceptible animal must actually come into contact with the infective material in a manner which will lead to the infection of the animal. There must also be sufficient organisms present to constitute an infective dose. If the disease has an intermediate host, there is an extra step in the process.

Volume of imported material

The risk of introducing a new disease also depends on the quantities of material entering Australia. The calculations to date have been based on the presence of infective material in a fish (or in the two constituent fillets). The number of fillets entering the country would need to be calculated and compensations made.

DISCUSSION

AQIS has not been using exact figures, due to the difficulty in obtaining more than "best guess" estimates. Any attempt to portray the risk assessment as accurate will lead to many disputes, and the process should only be used as a guide in determining the relative
risk. The key question then centres on the acceptable level of risk; any meaningful agreement is extremely difficult to reach. The consequences of disease introduction are very difficult to determine, and those who benefit from importation of fish are unlikely to suffer as much as those who are adversely affected by disease importation.

There are several specific difficulties related to the epidemiology of fish diseases. The time-lag between the introduction of disease into a wild fish population and detection of the disease is likely to mean that eradication of the disease is difficult and probably impossible with present technologies. Australian fish species have not been exposed to these exotic disease agents; the impact of the introduction of such agents is therefore unknown, although the goldfish ulcer disease strain of *Aeromonas salmonicida* has recently caused disease in a native fish species, the silver perch (*Bidyanus bidyanus*).

There is likely to be considerable internal dislocation in Australia if exotic fish diseases are introduced and have a limited watershed distribution. Depending on the pathogen involved and the predisposition of the agent to spread, interstate controls on the movement of products may be imposed, with the inherent associated certification requirements, which will cause additional costs to both industry and the consumer.

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**Résumé** : Les auteurs étudient la méthode actuellement utilisée par les Services australiens de quarantaine et d'inspection (Australian Quarantine and Inspection Service : AQIS) pour évaluer les risques liés à l'importation de produits à base de saumon.

L'AQIS a effectué une enquête en la matière, conformément à la réglementation australienne sur la transparence et la responsabilité dans le processus de prise de décision relatif à la quarantaine.

Les auteurs passent en revue les facteurs qui devraient être pris en compte lors de l'évaluation des risques liés à l'importation de ces produits et font état des difficultés rencontrées dans l'épidémiologie des maladies des poissons.


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**Resumen** : Los autores estudian el método utilizado por el Servicio australiano de cuarentena e inspección (Australian Quarantine and Inspection Service: AQIS) para evaluar los riesgos derivados de la importación de productos a base de carne de salmón.
El AQIS llevó a cabo una encuesta al respecto, conforme a la reglamentación australiana que se refiere a la transparencia y la responsabilidad en el proceso de tomar decisiones sobre cuarentenas.

Los autores examinan los factores que habría que tener en cuenta en ocasión de la evaluación de riesgos derivados de la importación de estos productos y se refieren a las dificultades asociadas a la epidemiología de las enfermedades de los peces.

PALABRAS CLAVE: Encuesta – Evaluación de riesgos – Factores de riesgo.

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REFERENCES
