

Supplementary Risk Analysis:
Extension of countries eligible
to export frozen, skinless,
boneless fillet meat of
Oreochromis spp. (tilapia)
under the import health
standard fisfillic.spe

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Approved for general release

A handwritten signature in black ink that reads 'Christine Reed'.

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Executive summary

In response to requests to extend the list of countries from which it is permissible to import frozen, skinless, boneless fillet meat of tilapia (*Oreochromis* spp.), a supplementary risk analysis was carried out.

The current import health standard (IHS) permits entry of the commodity only from Brazil and China. Vietnam, Malaysia, Thailand, the Philippines and Indonesia were assessed with a view to making them specified countries for import. No changes were suggested to the commodity definition.

Recent scientific literature on *Oreochromis* spp., published since the original risk analysis was completed, was examined, as was the health status of tilapia in the nominated countries. Four parasitic organisms were identified as potential hazards not covered by the original risk analysis. No additional bacterial, viral or fungal pathogens were identified. Assessments of the four additional organisms determined that none represented a risk in the defined commodity.

It was concluded that Vietnam, Malaysia, Thailand, the Philippines and Indonesia can be specified as countries from which the commodity may be imported under the terms of the existing IHS, without adversely affecting the current level of risk.

1. Background

The import requirements for skinless, boneless, frozen tilapia (*Oreochromis* spp.) fillet meat, encompassed within the Import Health Standard (IHS), *fisfillic.spe*, was finalised in March 2008. This IHS limited the importation of frozen, skinless, boneless fillet meat of *Oreochromis* spp. to those produced in Brazil and China.

There is, in addition, considerable production of tilapia in other countries including Viet Nam, Malaysia, Thailand, the Philippines and Indonesia. As a result, there have been a number of requests to extend the IHS to include these additional countries. There have been no requests to amend the commodity definition and thus it remains the same regardless of country of origin.

As the risk analysis, from which the IHS was developed, was comprehensive in its consideration of the global risks from tilapia fish, the extension of country of origin requires only a review of pathogen reports since 2007, and any specific reports from Viet Nam, Malaysia, Thailand, the Philippines and Indonesia.

This document details the results of this additional consideration.

2. Analysis of relevant literature

Available scientific literature was consulted for any reports of pathogens (viral, bacterial, fungal or parasitic) associated with *Oreochromis* spp. to cover the time period from the drafting of the risk analysis to the current time. In addition information was sought from available sources on *Oreochromis* spp., specifically in Viet Nam, Malaysia, Thailand, the Philippines and Indonesia.

Recent reports of potential hazards associated with *Oreochromis* spp. are:

1. *Haplorchis pumilio*, *H. taichui*, *H. yokogawa*, *Centrocestus formosanus*, *Stellantchasmus falcatus* and *Echinochasmus japonicus* (all digenean parasites) in Viet Nam (Chi *et al.* 2008);
2. *Aeromonas hydrophila* in Malaysia (Dhanaraj *et al.* 2008);
3. Heterophyidae digenean parasites in Viet Nam (Nguyen Thi Hop *et al.* 2007);
4. Ciliophora (*Epistylis* spp., *Ichthyophthirius multifiliis*, *Trichodina* spp.), monogenea (*Cichlidogyrus* spp. and *Dactylogyrus* spp.), digenea (*Transversotrema* spp.), branchiurian crustacea (*Argulus* spp.), copepod crustacea (*Caligus* spp. and *Lamproglana* spp.) and isopod crustacea (*Alitropus* spp.) in the Philippines (Arthur and Lumanlan-Mayo 1997);
5. Protozoa (*Chilodonella* spp., *Ichthyophthirius multifiliis*, *Trichodina* spp.), monogenea (*Cichlidogyrus* spp. and *Gyrodactylus* spp.), digenea (*Centrocestus formosanus*), branchiurian crustacea (*Argulus* spp.) and copepod crustacea (*Caligus* spp.) in Viet Nam (Arthur and Te 2006); and
6. The digenea *Clonorchis sinensis* (Viet Nam), *Opisthorchis viverrini* (Viet Nam and Thailand), *Haplorchis pumilio* (Thailand), *H. taichui* (Viet Nam, Malaysia, Thailand and the Philippines) and *H. yokogawai* (Malaysia, Thailand, the Philippines and Indonesia) (Chai *et al.* 2005).

Of these only *Stellantchasmus falcatus*, *Transversotrema* spp., *Opisthorchis viverrini* and *Alitropus* spp. were not considered in the original risk analysis. These four organisms will be considered further in this document.

3. Consideration of individual organisms

3.1. *Stellantchasmus falcatus*

The metacercariae of this digenean parasite may be found encysted in fillet meat and thus could be present in the commodity. However, freezing of the commodity to -20°C for 18 hours has been shown to be sufficient to inactivate any encysted larvae (Wongsawad *et al.* 2005), thus existing health standards would be sufficient to render the likelihood of entry, exposure and establishment of this parasite to negligible.

3.2. *Transversotrema* spp.

The metacercariae of this digenean parasite encyst under the scales (Paperna 1995). Being part of the dermis, this portion of the fish would be removed during the production of skinless fillet meat and thus this is not considered to represent a hazard in the commodity.

3.3. *Opisthorchis viverrini*

This digenean parasite may be found as encysted metacercariae in the fillet muscle of infected fish, which are secondary intermediate hosts. The definitive host of this parasite is the civet cat, *Felis viverrini*, although cats, dogs, foxes and pigs may act as more common hosts (Ko 1995). It is a zoonotic parasite, infecting the bile ducts of humans and is prevalent in northern Thailand. It utilises *Bithynia* spp. snails as primary intermediate hosts (Ko 1995) and, as these are absent from New Zealand (Spencer *et al.* 2002), there is negligible likelihood of the parasite establishing here. The most common fish hosts in Thailand are cyprinids (Ko 1995), but infection has been reported from tilapia (Chai *et al.* 2005).

This parasite is placed in the Opisthorchiidae family, along with *Clonorchis sinensis*, which was considered in the original risk analysis. Freezing for 72 hours at -12°C is reported to inactivate *C. sinensis* (Fang *et al.* 2003). Members of the Heterophyidae family are recognised as being amongst the hardest digeneans to inactivate, requiring 12 days at -4°C (Elnawawi *et al.* 2000). In addition, the related parasite, *Opisthorchis felineus* is inactivated by 20 hours at -28°C (Fattakhov 1989), with only 4% remaining active after 92 hours at -22°C (Fattakhov 1985).

These temperature tolerance values lie within those considered in the original risk analysis, thus the existing risk analysis would apply equally to *O. viverrini* and it is not considered to be an actual hazard in the commodity.

3.4. *Alitropus* spp.

This isopod crustacean is a non cymothoid flabellifera, a group that is generally not parasitic, although some Aegidae family members are parasitic. When *Alitropus* spp. are found on fish they are present on gills, fins and the body surface (Lester and Roubal 1995). The processing involved in the production of the commodity would remove these organisms and thus they are not a hazard in the commodity.

4. Conclusion

Having examined novel scientific literature published since the original risk analysis was drafted, and the reported pathogen burden of tilapia in Viet Nam, Malaysia, Thailand, the Philippines and Indonesia it is concluded that only four additional potential hazards could be associated with the fish from which the commodity is derived.

Further assessment of these four organisms resulted in none being considered an actual hazard in the commodity when all aspects of the commodity definition in the original risk analysis are considered.

It is therefore concluded that frozen, skinless, boneless fillet meat of *Oreochromis* spp. from Viet Nam, Malaysia, Thailand, the Philippines and Indonesia can be regarded as being equivalent to the product from those countries already specified, under the conditions required in the existing IHS (fisfillic.spe).

References

- Arthur, J R; Lumanlan-Mayo, S (1997)** *Checklist of the parasites of fishes of the Philippines*. FAO Fisheries Technical Paper No. 369, 102pp FAO, Rome;
- Arthur, J R; Te, B Q (2006)** *Checklist of the parasites of fishes of Viet Nam*. FAO Fisheries Technical Paper No. 369/2, 133pp FAO, Rome;
- Chai, J Y; Murrell, K D; Lymberry, A J (2005)** Fish-borne parasitic zoonoses: Status and issues. *International Journal for Parasitology* 35 1233-1254.
- Chi, T. T. K.; Dalsgaard, A; Turnbull, J F; Tuan, P A; Murrell, K D (2008)** Prevalence of zoonotic trematodes in fish from a Vietnamese fish-farming community. *Journal of Parasitology*. 94(2): 423-428.
- Dhanaraj, M; Haniffa, M A; Muthu, R C; Arockiaraj, A J; Raman, S S; Singh, A S V (2008)** Haematological analysis of common carp (*Cyprinus carpio*), gold fish (*Carassim auratus*), tilapia (*Oreochromis mossambicus*) and stinging catfish (*Heteropneustes fossilis*) spontaneously infected with *Aeromonas hydrophila*. *Malaysian Journal of Science*. Kuala Lumpur, Malaysia 27(1): 61-67.
- Elnawawi, F A; Tawfik, M A A; Shaapan, R M (2000)** Some methods of inactivation or killing of encysted metacercariae in tilapia muscles. *Egyptian Journal of Veterinary Science* 34 31-38.
- Fang, Y; Dai, C; Jun, N; Hui, M (2003)** Study on the effects of freezing and irradiation on the survival of *Clonorchis sinensis* metacercaria in freshwater fish. *China Food Health Journal* 5 410-411.
- Fattakhov, R G (1985)** The effect of low temperatures on the viability of *Opisthorchis felineus* metacercariae. *Meditinskaya Parazitologiya i Parazitarnye Bolezni*(No.6): 37-38.
- Fattakhov, R G (1989)** Low temperature regimes for treating fish containing *Opisthorchis* larvae. *Meditinskaya Parazitologiya i Parazitarnye Bolezni*(No. 5): 63-64.
- Ko, R C (1995)** Fish-borne Parasitic Zoonoses. In Woo, P T K (ed) *Fish Diseases and Disorders, Volume 1: Protozoan and Metazoan Infections*. CAB International; Wallingford, Oxon; pp 631-672.
- Lester, R J G; Roubal, F R (1995)** Phylum Arthropoda. In Woo, P T K (ed) *Fish Diseases and Disorders Volume 1: Protozoan and Metazoan Infections*. CAB International; Wallingford, Oxon; pp 475-598.
- Nguyen Thi Hop; Nguyen Van De; Murrell, D; Dalsgaard, A (2007)** Occurrence and species distribution of fishborne zoonotic trematodes in wastewater-fed aquaculture in northern Vietnam. (Special issue: Wastewater use - food safety and health aspects.). *Tropical Medicine and International Health*. Oxford, UK 12 Su.
- Paperna, I (1995)** Digenea (Phylum Platyhelminthes). In Woo, P T K (ed) *Fish Diseases and Disorders, Volume 1: Protozoan and Metazoan Infections*. CAB International; Wallingford, Oxon; pp 329-390.
- H. G. Spencer, R. C. Willan, B. A. Marshall and T. J. Murray. (2002)** Checklist of the Recent Mollusca described from the New Zealand Exclusive Economic Zone <http://www.molluscs.otago.ac.nz/intro.html> University of Otago, accessed 16 November, 2006
- Wongsawad, C; Kawin, S; Wongsawad, P; Paratasilpin, T (2005)** Some factors affecting *Stellantchasmus falcatus* metacercaria in laboratory. *Southeast Asian Journal of Tropical Medicine and Public Health* 36((Supplement 4)): 117-199.