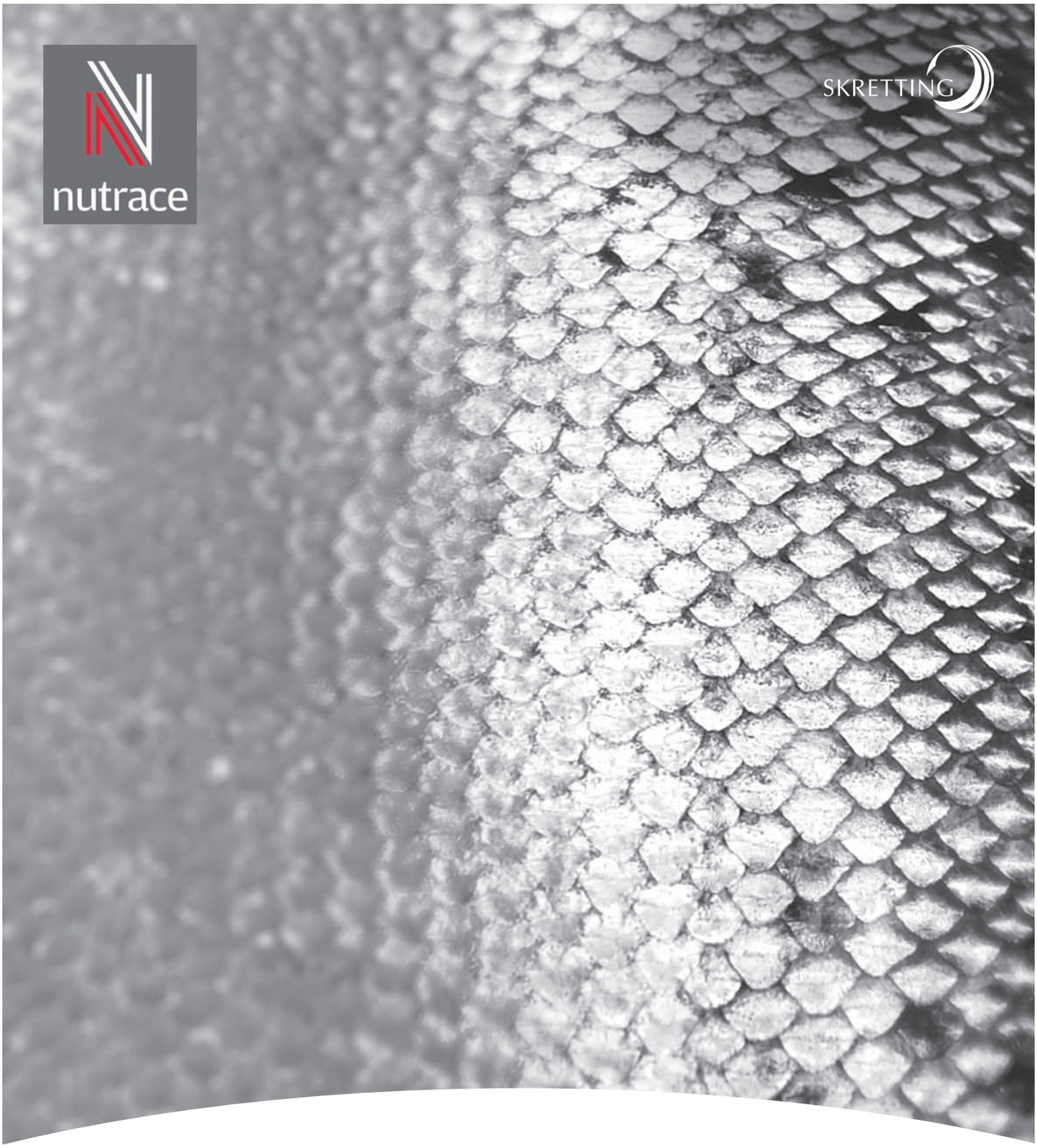


nutrace

SKRETTING

Skretting Australia
Residue Monitoring

Summary of Results 2007-2011
Issued April 2012

www.skretting.com.au

Globally, Skretting is a leader in the production and supply of feed for farmed fish and shrimp. Total annual production of high quality feeds is more than 1.5 million tonnes.

Skretting has operating companies on five continents to produce and deliver feeds from hatching to harvest for more than 50 species of farmed fish and shrimp. Skretting is owned by international feed group Nutreco. Quality, innovation and sustainability are the guiding principles embedded in the Nutreco culture from research and raw material procurement to products and services for agriculture and aquaculture. Nutreco employs approximately 10,000 people in 30 countries, with sales in 80 countires.

Skretting Australia is the leading producer of fish feed, supplying to a wide range of customers located all over Australia and New Zealand.

For more information go to www.skretting.com.au

Contents

About this report

Skretting conduct regular testing of our feeds for undesirable substances. This is part of Skretting's Quality System, which acts to validate the quality controls performed throughout the year. These controls include frequent analysis of raw materials, supplier assessments and systems to control the pellet manufacturing process.

Skretting's Food Safety Team regularly review potential residues based on a risk assessment considering the scale of use, toxicity and persistence of each compound. A global testing program for these residues is set annually. Testing is conducted by Skretting-approved, accredited laboratories that have demonstrated the highest level of competancy and repeatablity.

Skretting Australia undertakes residue testing on both raw materials and finished feeds to ensure their quality. Results reported here relate to complete fish feeds produced by Skretting Australia. Samples chosen best represent production since publishing the previous report.

What is this report telling me about Skretting Australia feeds?

This Residue Monitoring Report summarises the level of undesirable substances in Skretting Australia feeds from 2007 to 2011. Results from monitoring in 2011 indicate that Skretting Australia feeds have again met all Australian and European requirements and that the levels of undesirable substances found in feeds are substantially less than the limits set by authorities.

We provide this report to keep Skretting customers informed of the status of our monitoring results.

Who sets Residue Limits?

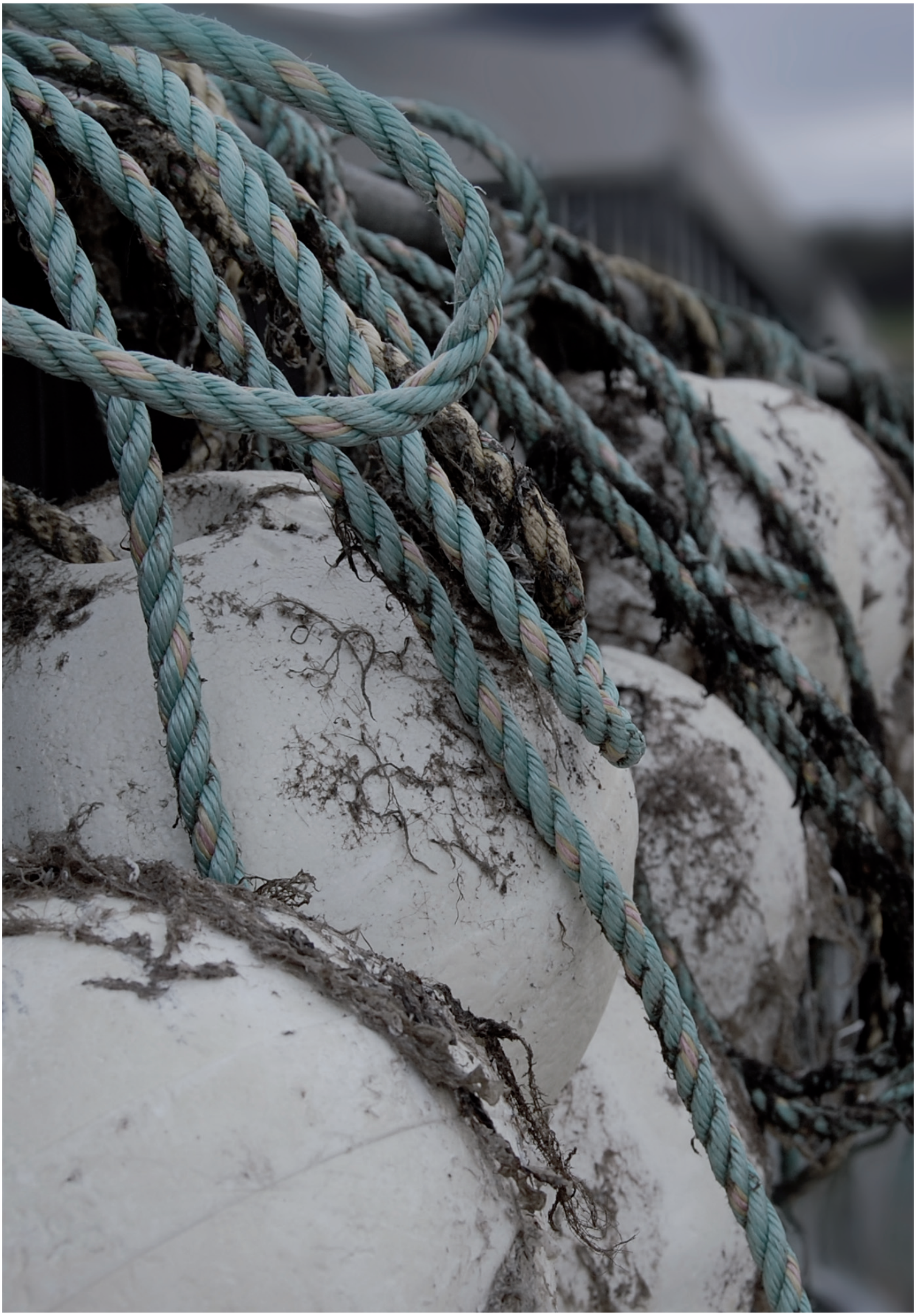
Skretting's Residue Monitoring Report uses the Australian residue limits (maximum residue limit and the extraneous residue limit MRL/ ERL) as well as the EU statutory limits (equivalent to MRL standards) where they are available. If an Australian residue limit does not exist for a parameter, the relevant EU statutory limit has been used.

Maximum Residue Limit Standards (MRL/ ERL)

The Australian Pesticides and Veterinary Medicines Authority (APVMA) sets maximum residue limits (MRLs) for agricultural and veterinary chemicals. At the time that the MRLs are set, the APVMA undertakes a dietary exposure evaluation to ensure that the levels do not pose an undue hazard to human health.

The MRL and ERL are defined as the maximum concentration of a residue that is recognised as acceptable in or on a food, agricultural commodity, or animal feed. The difference being that an ERL refers to a pesticide residue arising from environmetal sources (including former agricultural uses) other than the use of the pesticide directly or indirectly on the commodity.

If you have any questions about this report, please contact Trine Karlsrud (trine.karlsrud@skretting.com).



Nutrace®

Nutrace® is Nutreco's company-wide proactive program to assure feed-to-food quality and is implemented in all Skretting businesses.

Nutrace® safeguards the quality of Nutreco products and services. Just as importantly, it improves operations and profitability for its customers and their food chain partners.

The Nutrace® program, complying with legislation and customer demands, is structured in five Nutrace® specified standards:

Certified Quality
- Commitment to international quality standards in all parts of the chain;
- Based on Hazard Analysis and Critical Control Point (HACCP) and Nutreco's own Health, Safety, Environment & Quality (HSEQ) system;
- External certification (e.g. International Organisation for Standardisation (ISO) and FeedSafe);
- Customers are welcome to audit operations and check these certifications.

Ingredient Assessment and Management
- Common standards for the assessment and management of ingredients and suppliers;
- Supported by Nutreco-wide ingredient assessment and management;
- Only approved feed ingredients and suppliers are used by Nutreco companies.

Monitoring
- Implemented monitoring system;
- Harmonised sampling & analysis methods;
- Approved laboratories;
- Nutreco-wide early warning and rapid alert system;
- Control of non-conformities;
- Clear procedures for internal measures and external notification.

Risk Management
- Implemented risk management system to take appropriate precautions to minimise risks;
- Crisis manuals have been developed based on experience and simulations. These specify necessary corrective actions, communications and, where necessary, recall procedures.
- Well-trained crisis teams are prepared to minimise the impact of incidents;
- Supported by a comprehensive, global network throughout the industry, with regulators, Non-Government Organisations (NGOs) and other stakeholders.

Tracking & Tracing
- Implemented tracking & tracing-systems;
- Keeping record of every input and process from feed ingredient purchasing to finished product delivery.

PCBs & Dioxins

Background

Polychlorinated biphenyls (PCBs) are extremely persistent organic pollutants historically used as coolants, plasticisers, lubricants etc. They continue to be found in the environment and in living organisms. PCBs released into the environment eventually enter the food chain and can build up in fish and other marine animals. Manufacturing of PCBs has been banned in most countries since the 1980s. Australia banned the importation of PCBs in 1975.

The term "dioxins" includes polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs). These are listed on laboratory reports as PCDD/F and are the main focus in terms of food safety. PCDD/Fs are unwanted by-products of chemical manufacture, bleaching processes and all combustion processes. They have been shown to bioaccumulate in humans and wildlife due to their lipophilic (fat liking) properties. Dioxins enter the general population almost exclusively from ingestion of food, specifically through the consumption of meat and dairy products.

PCBs and dioxins (and furans) have a similar structure and they therefore have a similar toxic effect. The PCBs are usually present in much higher quantities than dioxins, but are less toxic. The most toxic PCBs are classed as 'dioxin-like' by the World Health Organisation (WHO). It is these 12 'dioxin-like' PCBs which the EU has set limits for in combination with dioxin residues.

Health issues

PCBs and dioxins are toxic molecules, which in small quantities may cause problems with reproduction and cancer. PCB exposures, particularly before birth, have been linked in humans with lower IQ, hyperactivity, shortened attention span and delayed acquisition of reading skills.

Limits

Substance	*Unit*	*Australia*[1]	*EU/ Norway*[2]
Dioxins (Dioxins + furans)	TEQ (WHO) ng/kg	No	2.25
Sum of Dioxin and Dioxin-like PCBs	TEQ (WHO) ng/kg	7.0	7.0

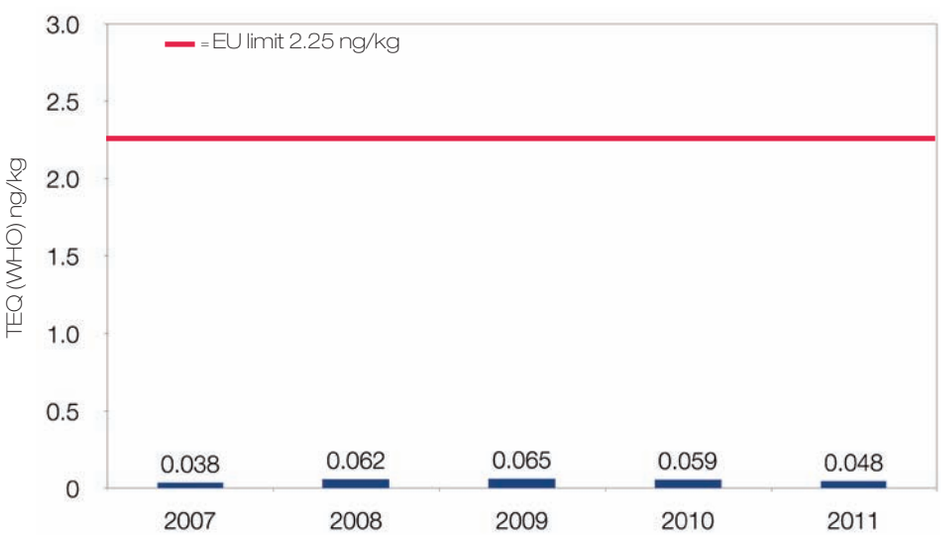
ng = nanogram
kg = kilogram
TEQ = Toxic Equivalent (the amount of toxin or other poison per kilogram of body weight necessary to kill an animal).
WHO = World Health Organisation (Standard).

[1]The MRL Standard: Maximum residue limits in food and animal feedstuff. APVMA October, 2010 33pp.

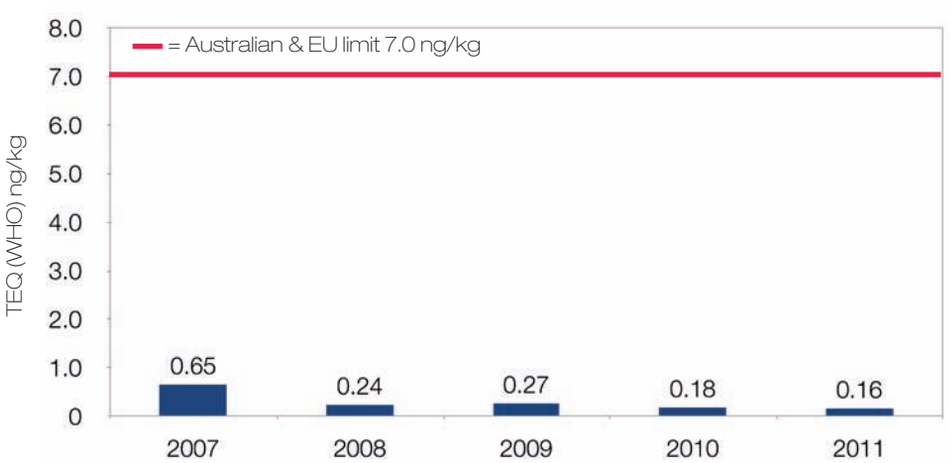
[2]OJ L140, 30.5.2002, p. 10. Directive 2002/32/EC of the European Parliament and of the Council fo 7 May 2002 on undesirable substances in animal feed.

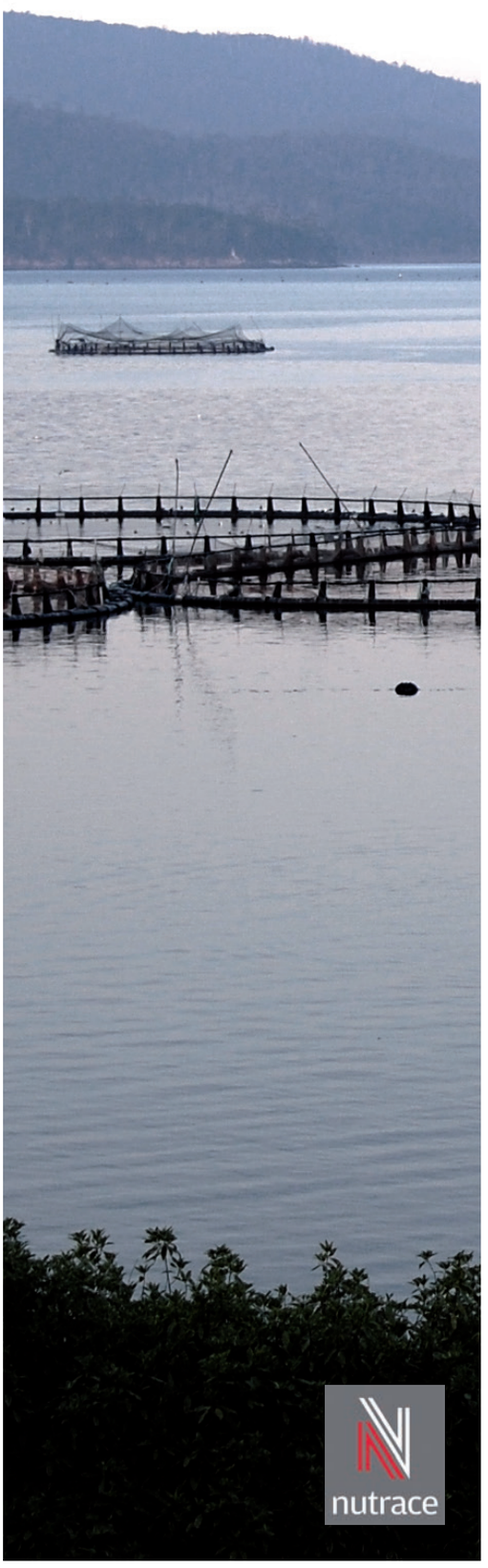
Results

Concentration of Dioxins (PCDD/ PCDF)
in Skretting Australia Fish Feed



Concentration of Sum Dioxins & Dioxin-like PCBs (WHO-
PCDD/F+PCB TEQ) in Skretting Australia Fish Feed





Pesticides

Background

Pesticides have been widely and commonly used to protect crops, livestock, buildings and households from pests. Although widespread use has been banned in many countries, several pesticides are still produced in developing countries. Many pesticides continue to be detected in precipitation, soil, sediment, biota, aquatic ecosystems and food.

Aldrin & Dieldrin
Aldrin and dieldrin (a metabolite of aldrin as well as a marketed pesticide) are both fat soluble, persistent and bio-accumulating organochlorine insecticides. Widely used as insecticides in agriculture, the registration of the last aldrin and dieldren products in Australia were cancelled in 1994 and 1988 respectively. Both compounds are classified as Schedule 6 ('Poison') in the Standard for the Uniform Scheduling of Drugs and Poisons (SUSDP). Worldwide, the use of both compounds is severely restricted or banned in many countries. In the environment, aldrin is rapidly converted to dieldrin.

Chlordane
A non-systemic (ie not taken up in the plant) insecticide of agricultural crops, Chordane is a restricted chemical product and is classified as Schedule 6 ("Poison") in the SUSDP. Chlordane is not used in Australia - the last registered Chlordane product was withdrawn in 1997. Chlordane is banned in Europe (1981) and the USA (1978) and currently in most other countries worldwide. Chlordane is highly insoluble in water, persistent, bio-accumulating and highly lipophilic. In accordance with the Australian residue limit (ERL) standard, Chlordane is reported as the the sum of cis-, trans- and oxy-Chlordane isomers.

Dichlorodiphenyltrichloroethane (DDT)
DDT is an insecticide that was widely applied in agriculture and forestry. DDT products were classified as Schedule 5 ('Caution') or Schedule 6 ('Poison') in the SUSDP. Since the early 1970s severe restrictions and bans on its use have been introduced in many countries (eg. Banned in the USA in 1972 and Europe since 1986). In Australia, registrations of all DDT products had been cancelled by the late 1990's (the majority of products had not been used since the mid-1980's). DDT is highly insoluble in water, lipophilic and persistent in the environment. Because of the lipophillic properties and persistence in the environment, DDT and related compounds are bio-accumulating and biomagnified along the food chain. Although it is banned in most countries worldwide, DDT is still used for vector control (eg mosquitoes), especially in areas with endemic malaria.

Endosulfan (Sum of alpha- & beta-Endosulfan & Endosulfan sulphate)
Endosulfan is a non-systemic organochlorine pesticide used in agricultural and horticultural crops for control of insects and mites. Registration of Endosulfan in Australia was cancelled in October 2010. Endosulfan is banned in Europe (2006) and currently restricted or banned in most other countries worldwide. In contrast to the majority of organochlorine pesticides, endosulfan is less lipophillic – consequently, biomagnification and bio-accumulation along the food chain is less likely to occur. In accordance with the Australian residue limit (MRL) standard, Endosulfan is reported as the the sum of

alpha- & beta-endosulfan isomers and endosulfan sulphate.

Endrin (Sum of Endrin & delta-keto-Endrin)
Endrin is a fat soluble organochlorine insecticide - at one time registered in Australia as an insecticide, miticide and aviancide. Classified as Schedule 7 ('Dangerous Poison') in the SUSDP, the last Australian-registered endrin product was cancelled in 1990. Endrin has been banned in most countries worldwide during the last 25years. Endrin is partly transformed in the environment into delta-keto endrin.

Heptachlor
Heptachlor is a non-systemic contact insecticide – at one time registered in Australia as a termaticide and insecticide. Classified as Schedule 6 ('Poison') in the SUSDP, the last Australian-registered heptachlor product was cancelled in 1997 (the majority of heptachlor products were cancelled by the end of 1990). Heptachlor is banned in Europe (1984) and most other countries worldwide. In the environment, heptachlor breaks down to heptachlor epoxide and photoheptachlor. All these compounds are lipophilic, persistent and bio-accumulate in the food chain. In accordance with the Australian residue limit (ERL) standard, heptachlor is reported as the the sum of heptachlor and heptachlor epoxide.

Hexachlorobenzene (HCB)
HCB is an agricultural pesticide used as a fungicide (seed disinfectant). The last Australian-registered HCB product was banned in 1987. HCB is banned in Europe (1981) and most other countries worldwide. HCB is highly insoluble in water, lipophilic, persistent and bio-accumulates in the food chain.

Hexachlorocyclohexane HCH (alpha- & beta -HCH)
Technical HCH was used as an insecticide worldwide. It is a mixture of isomers – the four predominant are alpha-, beta-, delta- and gamma-HCH (also known as lindane). Technical HCH is banned in Europe (1978) and most other countries worldwide. Alpha- & beta-HCH are lipophilic, persistent in environment, bio-accumulating and biomagnified along the food chain.

Lindane (gamma-HCH)
Lindane is an organochlorine insecticide and acaracide used in agriculture – very limited use in Australia with only one product available. Classified as Schedule 6 ('Poison') in the SUSDP, the last Australian-registered lindane product was cancelled in June 2010. Lindane is banned in Europe (1988) but is still used in some countries. Lindane and related compounds are lipophilic and persistent in environment. Lindane is bio-accumulating and biomagnified along the food chain to a lesser extent compared with Alpha- & beta-HCH.

Methoxyclor
Methoxychlor is an insecticide used in agriculture and horticulture – in Australia, used as an insecticidal dog shampoo. Classified as Schedule 5 ('Caution') in the SUSDP, the only Australian-registered methoxychlor product was cancelled in 1987. Methoxychlor is banned in Europe (2002) and currently restricted or banned in most other countries worldwide. Methoxychlor is highly insoluble in water, lipophilic and persistent in the environment.

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Health issues

The health effects of pesticides depend on the type of pesticide. Some, such as the organophosphates and carbamates, affect the nervous system. Others may irritate the skin or eyes. Some pesticides may be carcinogic. Others may affect the hormone or endocrine system in the body.

Limits

Pesticide	*Unit*	*Australia*[1]	*EU/Norway*[2]
Aldrin & Dieldrin (Sum of HHDN & HEOD)	mg/kg	E 0.01	0.02
Chlordane (Sum of cis-trans-and oxy-chlordane isomers	mg/kg	E 0.01	0.02
DDT (Sum of o,p'-DDT; p,p' -DDE; p,p' -DDT & p,p' -TDE)	mg/kg	E 0.05	0.05
Endosulfan (Sum of alpha- & beta- Endosulfan & Endosulfan sulphate)	mg/kg	0.3	0.005
Endrin (Sum of Endrin & delta-keto Endrin)	mg/kg	E 0.03	0.01
Heptachlor (Sum of Heptachlor & Heptachlor expoxide)	mg/kg	0.02	0.01
Hexachlorobenzene (HCB)	mg/kg	0.01	0.01
alpha-Hexachlorocyclohexane (alpha-HCH)	mg/kg	-	0.02
beta-Hexachlorocyclohexane (beta-HCH)	mg/kg	-	0.01
Lindane (gamma-HCH)	mg/kg	0.1	0.2
Methoxychlor	mg/kg	E 1.0	-

mg = milligram

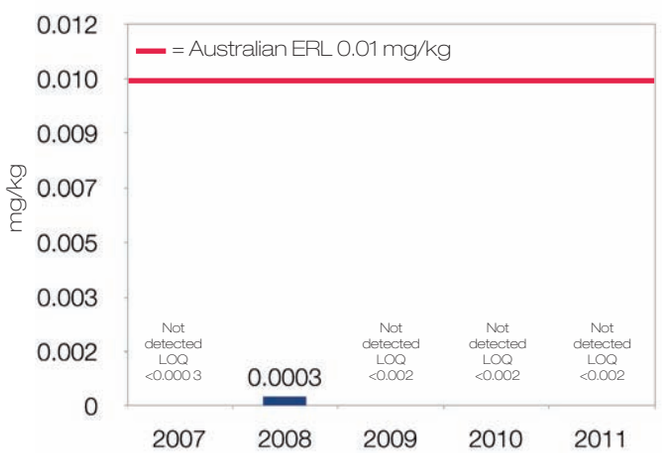
kg = kilogram

[1]The MRL Standard: Maximum residue limits in food and animal feedstuff. APVMA October, 2010 33pp. 'E' denotes an Extraneous Residue limit (ERL).

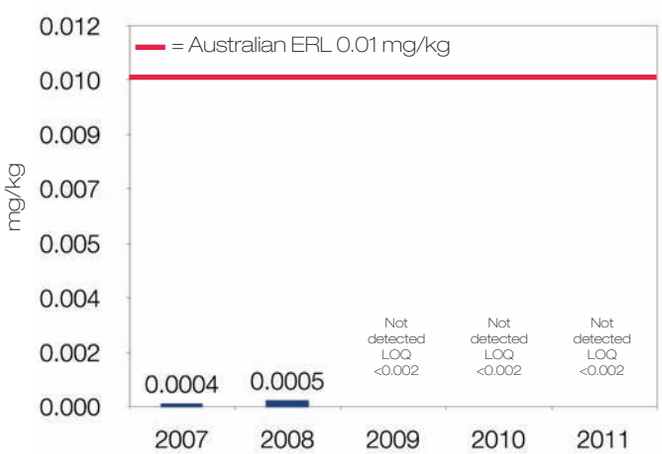
[2]OJ L140, 30.5.2002, p. 10. Directive 2002/32/EC of the European Parliament and of the Council fo 7 May 2002 on undesirable substances in animal feed.

Results

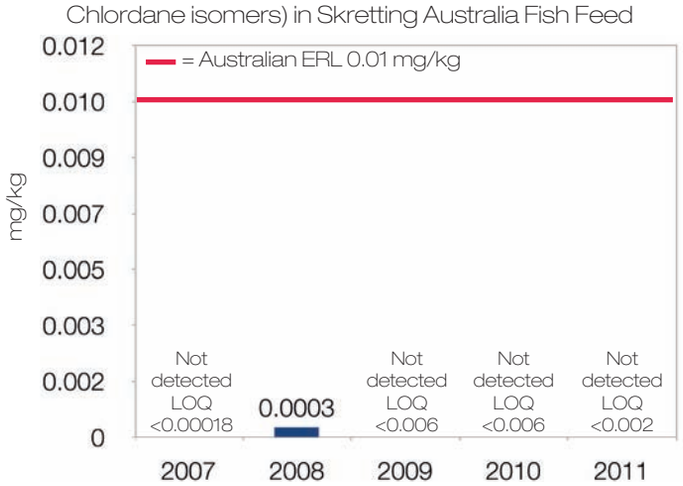
Concentration of Aldrin
in Skretting Australia Fish Feed



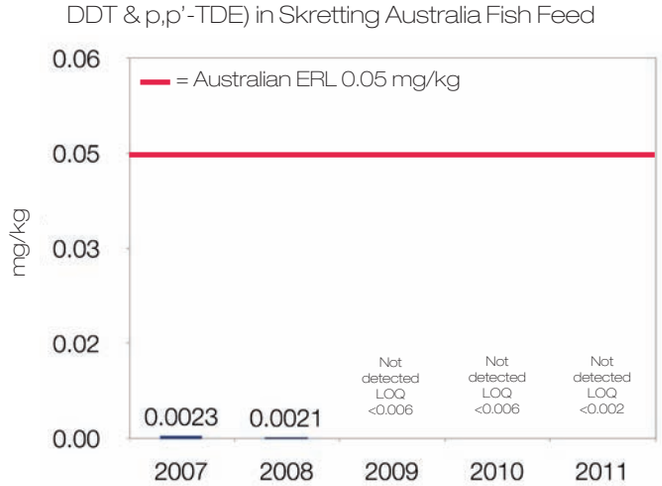
Concentration of Dieldrin
in Skretting Australia Fish Feed



Concentration of Chlordane (Sum of cis-, trans- and oxy-Chlordane isomers) in Skretting Australia Fish Feed



Concentration of DDT (Sum of o,p'-DDT; p,p'-DDE; p,p' DDT & p,p'-TDE) in Skretting Australia Fish Feed



LOQ = limit of quantification

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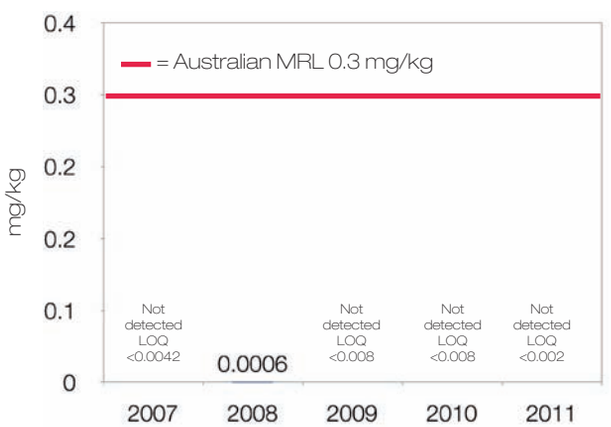
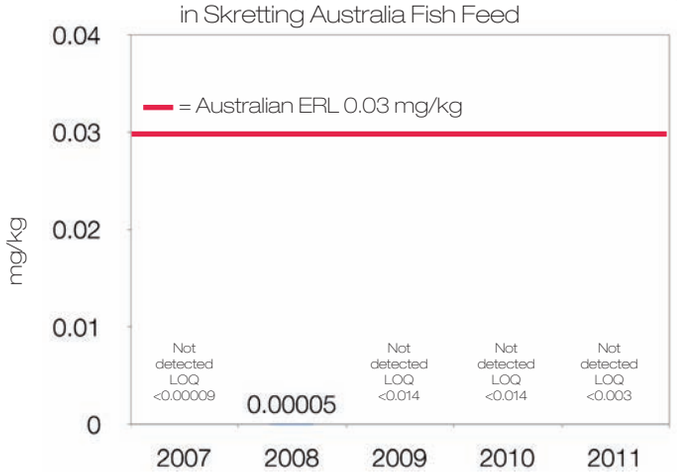
Results

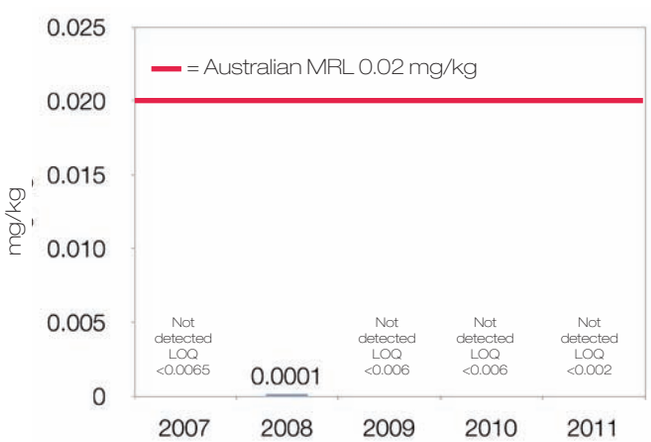
Concentration of Endosulfan (Sum of alpha- & beta-Endosulfan & Endosulfan sulfate) in Skretting Australia Fish Feed



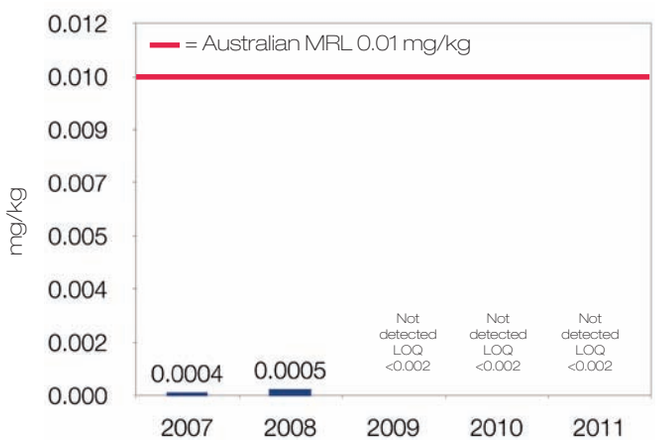
Concentration of Endrin (Sum of Endrin & delta-keto Endrin) in Skretting Australia Fish Feed



Concentration of Heptachlor (Sum of Heptachlor & Heptachlor epoxide) in Skretting Australia Fish Feed

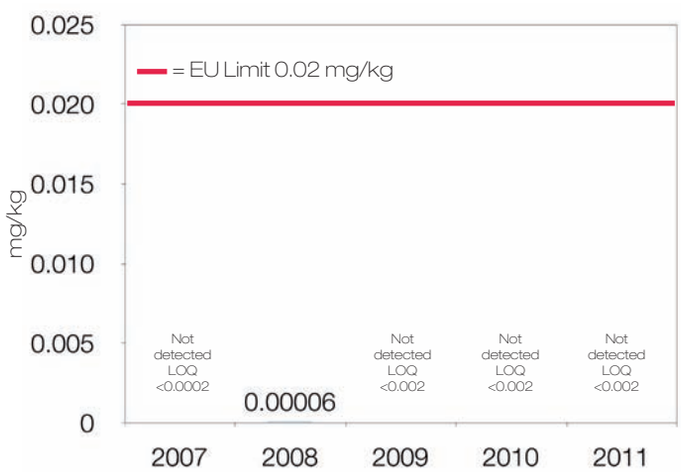


Concentration of Hexachlorobenzene (HCB) in Skretting Australia Fish Feed

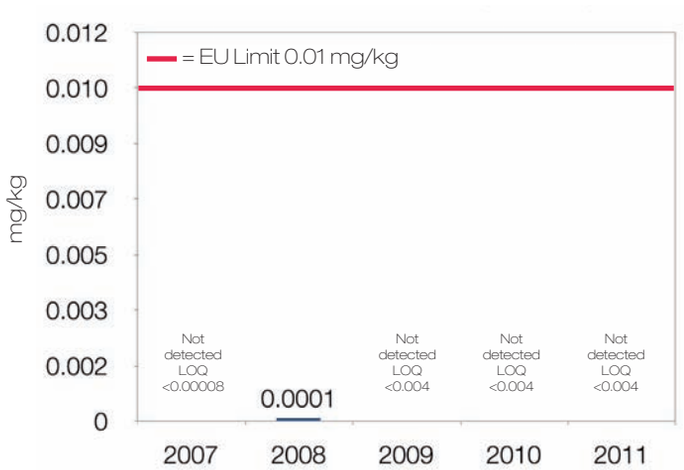


LOQ = limit of quantification

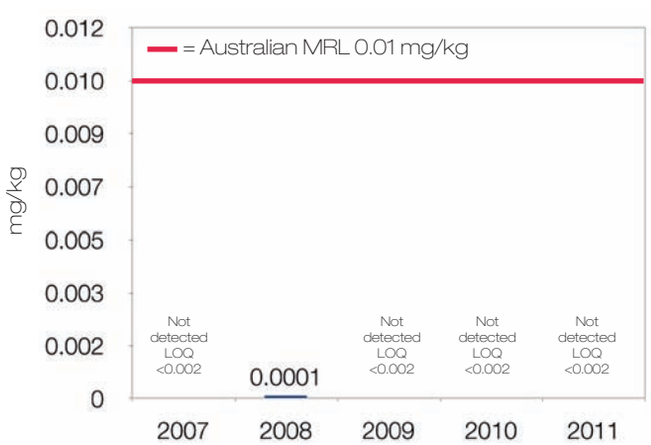
Concentration of alpha-Hexachlorocyclohexane (alpha-HCH) in Skretting Australia Fish Feed



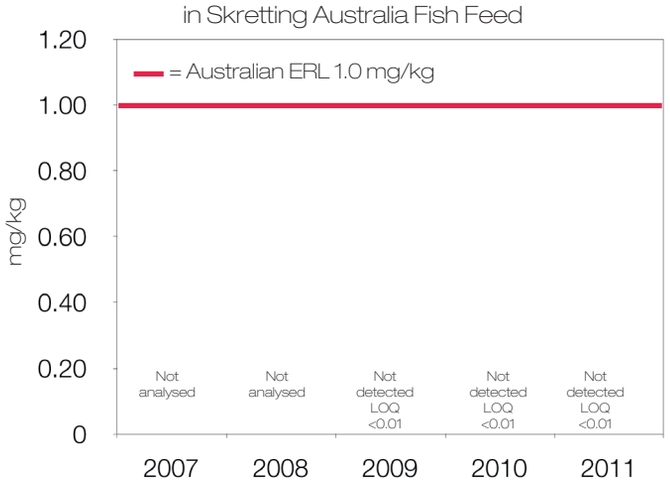
Concentration of beta-Hexachlorocyclohexane (beta-HCH) in Skretting Australia Fish Feed



Concentration of Lindane (gamma-HCH)) in Skretting Australia Fish Feed



Concentration of Methoxychlor in Skretting Australia Fish Feed



LOQ = limit of quantification

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Heavy Metals

Background

Arsenic
Arsenic and its compounds are used as pesticides and in various alloys. The toxicity of arsenic is strongly dependent on its chemical form. Although inorganic arsenic is highly toxic, organic arsenic is not. Accumulated arsenic in fish and shellfish is predominantly in organic form, and aquatic animals show a wide range of sensitivities to different arsenic compounds. Arsenic in fish feed is also predominately in the organic form, which is much less toxic than the inorganic form.

Cadmium
Cadmium is commonly found in its metallic form and as sulfides and sulfates. Globally, about three-quarters of cadmium is used in batteries and most of the remaining quarter is used mainly for pigments, coatings and plating, and as stabilizers for plastics.

Lead
Sources of lead found in the environment are multiple, and the metal is truly ubiquitous, being commonly found in food, water, and air. Evidence exists that lead in the environment has increased during the past 200 years, and it is not surprising that it can be found as a contaminant of aquatic animals.

Mercury
Mercury is much more harmful to living organisms as an organic metal compound than as the element. The most toxic form of mercury is methylmercury, which damages the central nervous system. It is found in fish because industrial effluents containing mercury are discharged into rivers or seas where the mercury is converted into methylmercury by bacteria. It then moves up the food chain and accumulates in the bodies of some large wild fish, such as shark, marlin and swordfish. In farmed salmon the levels of mercury are very low, almost not detectable.

Health issues

Heavy metals such as mercury, lead, cadmium and arsenic have no known vital or beneficial effect on organisms, and their accumulation over time in the bodies of mammals can cause serious illness.

Limits

Substance	*Unit*	*Australia*[1]	*EU/Norway*[2]
Arsenic	mg/kg	No	10.0
Cadmium	mg/kg	No	1.0
Lead	mg/kg	No	5.0
Mercury	mg/kg	No	0.1

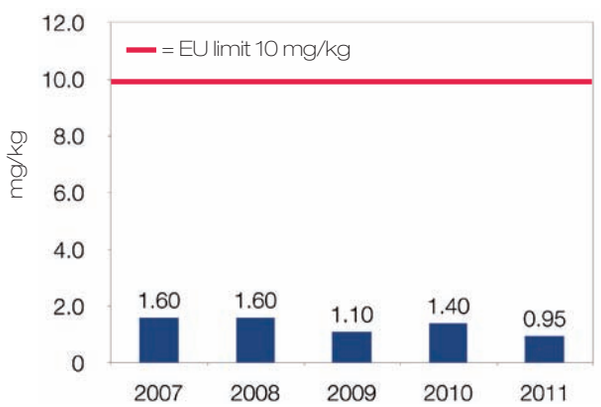
mg = milligram
kg = kilogram

[1]The MRL Standard: Maximum residue limits in food and animal feedstuff. APVMA October, 2010 33pp.

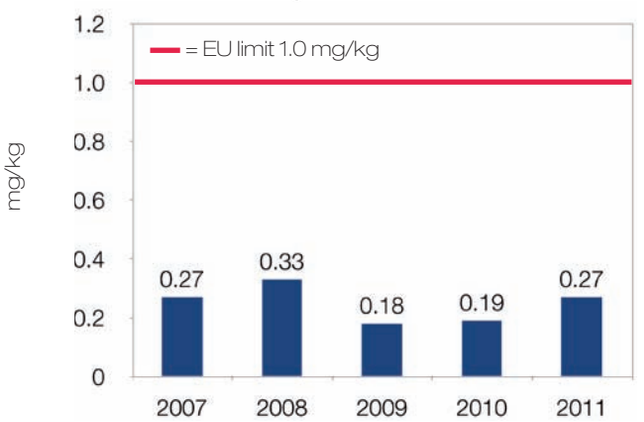
[2]OJ L140, 30.5.2002, p. 10. Directive 2002/32/EC of the European Parliament and of the Council fo 7 May 2002 on undesirable substances in animal feed.

Results

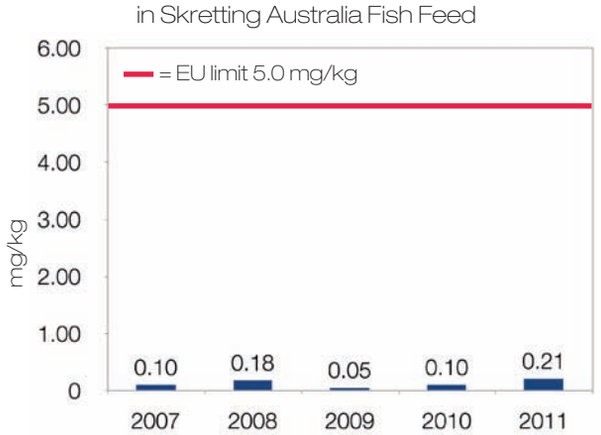
Concentration of Arsenic
in Skretting Australia Fish Feed



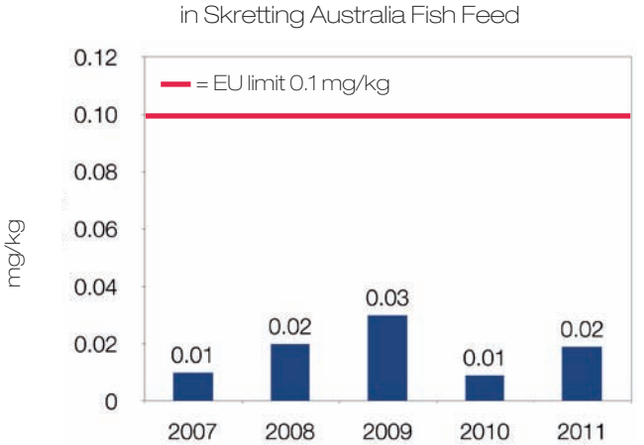
Concentration of Cadmium
in Skretting Australia Fish Feed

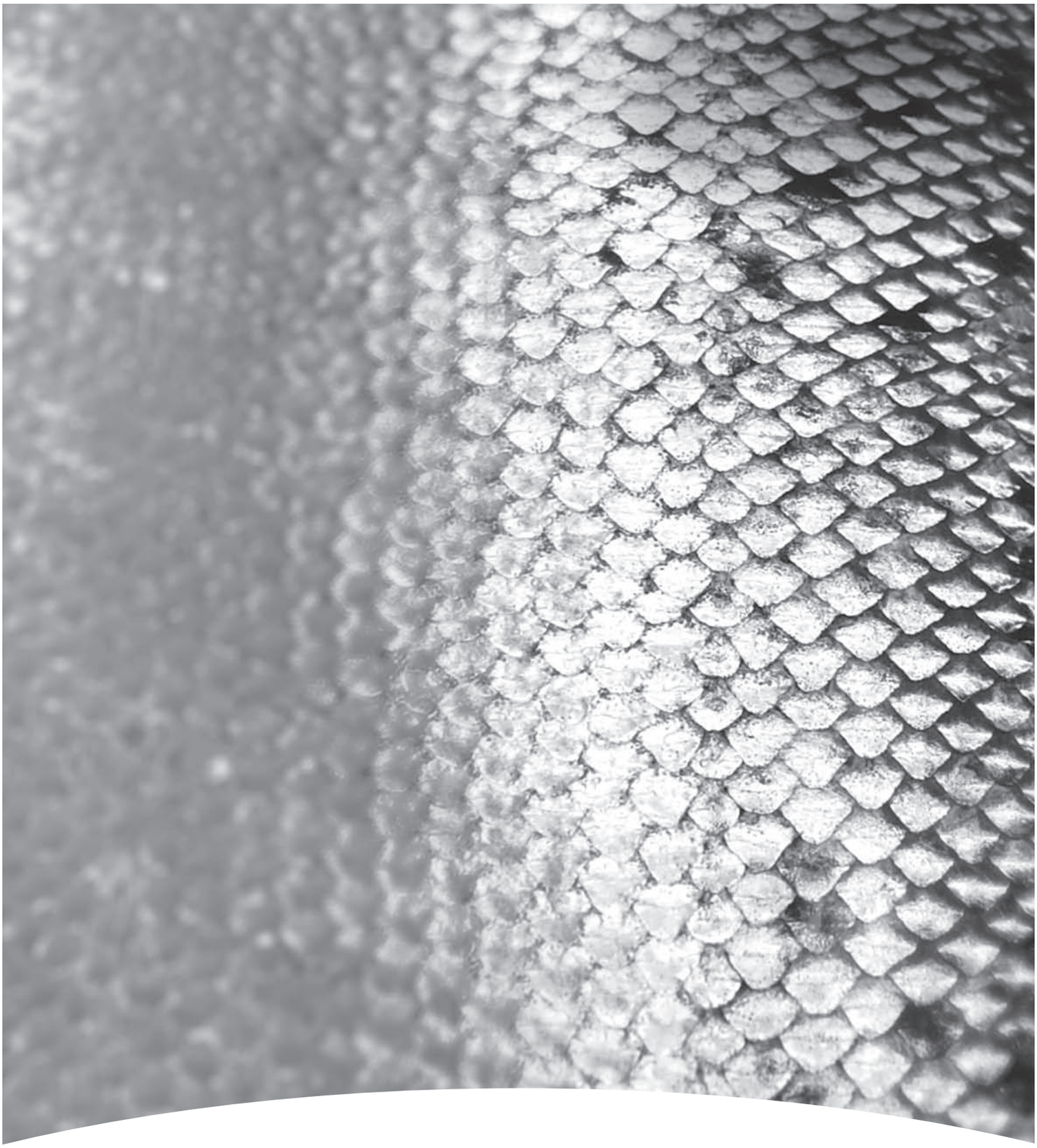


Concentration of Lead
in Skretting Australia Fish Feed



Concentration of Mercury
in Skretting Australia Fish Feed





26 Maxwells Road Cambridge
Tasmania Australia 7170
PO Box 117 Rosny Park
Tasmania Australia 7018

Telephone: +61 3 6216 1201

www.skretting.com.au