



OPRT

Sankaido Bldg. (9th Floor)1-9-13 Akasaka,
Minato-ku ,Tokyo, Japan 107-0052

Tel: 03-3568-6388; Fax:03-3568-6389

Website:<http://www.oprt.or.jp>

NEWSLETTER INTERNATIONAL May 2007, No.14

FOR CONSERVATION AND SUSTAINABLE USE OF TUNAS

Tuna and Health

TUNA IS HEALTH FOOD

Selenium in Tuna Protects Against Mercury

Dr. John Kaneko MS, DVM
Project Director
PacMar Inc. Honolulu, Hawaii

Fish is brain food and good for your health. The evidence is overwhelming that eating ocean fish including tuna is part of a healthy diet and life-style despite the low levels of mercury present. While it is agreed that mercury at high concentrations is toxic, the toxicity of trace levels of mercury found in open ocean fish like tuna remains undocumented and controversial.

There are 3 major long-term studies of the effects of mercury from seafood consumption on child development. No adverse health impacts were detected in children born to women that ate on average 12 meals of fish per week during pregnancy in the Seychelles Islands. In the UK, children's testing scores improved with increasing fish consumption by their mothers during pregnancy. Limiting fish consumption (2 meals of fish or less per week) was associated with greater risk of lower developmental scores. In contrast, a study in the Faroe Islands found diminished test scores in children whose mothers ate fish, but received 90% of their dietary mercury from eating pilot whale meat. The comparison of these 3 studies raises questions about the importance of the food source of mercury and the possibility of other nutritional factors that play a role in determining mercury health risk.

Selenium, an essential trace element may hold the answers. Selenium is vital to the body's antioxidant system, proper immune system function, has anti-cancer effects and is known to interact with metals including mercury. In the early 1970's, Dr. Howard Ganther and others from the University of Wisconsin first discovered that adding yellowfin tuna to the diet of animals being fed artificially high levels of mercury, protected against, rather than contributed to mercury toxicity. These results surprised the researchers and



Dr. J. Kaneko

led them to conclude that other nutritional elements in tuna were responsible for the protective effects. The likely candidate was selenium. Tuna and other open ocean fish are now known to be rich sources of healthy selenium. But can this explain why mercury in tuna has not been a health problem? What additional research or understanding is needed now to convince a wider spectrum of scientists, medical and health professionals of yet another important health benefit from eating ocean fish, especially tuna?

International Symposium on Selenium and Mercury Interaction

The interactions between dietary selenium and mercury are now the topic of exciting new research. Some of those studies were presented at a recent scientific meeting dedicated to the subject. *The First International Symposium on Selenium and Mercury Interactions*, was held February 22-24, 2007 in La Jolla, California organized by Dr. Gerhardt Schrauzer of the University of California at San Diego and the

International Association of Bioinorganic Scientists (IABS). The symposium assembled scientists from the US, Japan, Spain, Ireland, Slovenia, Denmark and elsewhere to share information on selenium and mercury interactions and health effects. Papers presented during this important symposium will be published in the journal, *Biological Trace Element Research*.

Of particular interest was a paper given by Dr. Nicholas Ralston of the Energy and Environmental Research Center in North Dakota on the biochemical basis of selenium's protective effects on mercury toxicity. Selenium has an extremely high binding attraction and strength with mercury, forming a biologically inactive compound, mercury selenide. For this reason it is important to have an excess of selenium over mercury in the diet, or run the risk of selenium deficiency and the toxic effects of mercury.



Dr. Gerhardt Schauzer (second from left), organizer of the First International Symposium on Selenium and Mercury Interactions for IABS with recipients of the Klaus Schwarz Award for excellence in selenium research: Dr. Dolph Hatfield, National Cancer Institute (far left), Dr. Howard Ganther, University of Wisconsin and Dr. Kazuo Suzuki, Chiba University, Japan.

Dr. Ralston and his colleagues suggest that selenium sequestration by mercury and the impacts on vital selenium-dependent functions may actually be the mechanism of mercury's toxic effects. His studies demonstrated the protective effects of selenium at levels found ocean fish in mice fed diets laced with methylmercury at levels higher than normally found in ocean fish. The assessment of mercury health risks is incomplete without also considering mercury and selenium interactions and the ratios of available mercury and selenium in the diet.

But how much selenium is in tuna? Dr. John Kaneko of PacMar Inc. in Honolulu, Hawaii presented the results of a recent survey (supported by NOAA) of selenium to mercury molar ratios in pelagic fish caught in the Hawaii longline fishery operating in the central North Pacific Ocean. All tuna species sampled, including bigeye, yellowfin, albacore and skipjack contained a healthy excess of selenium over the mercury content. For this reason, eating tuna, an excellent source of selenium, is more likely to protect against mercury toxicity, than cause it.

By contrast, pilot whale meat from the Faroe Islands contains not only a higher mercury concentration than most ocean fish, but also contains a much greater amount of mercury than selenium. For this reason, pregnant women in the Faroe Islands are now advised to stop eating pilot whale meat during pregnancy to avoid net mercury intake, but to continue to eat fish to provide their children with the health benefits of omega 3 fatty acids and selenium.

Tuna is a rich source of high quality protein, omega 3 fatty acids and selenium and should be considered part of a healthy diet. Tuna is health food, its good for your heart and there is growing evidence to support the long held belief that fish is also brain food for children, adults and seniors.

Symposium of Tuna Research Institute

International Situation surrounding Tunas: From capture in the wild to farming —A turning point in resource management—

In April this year, the Fisheries Research Agency of Japan established the Tuna Research Institute. The institute has, as its objective, smooth implementation of research and technological development for conservation and sustainable utilization of tuna resources.

At a commemorative symposium to mark the establishment of the institute at the Tokyo University of Marine Science and Technology on April 26, Prof. Yoshimi Suenaga of the university delivered a lecture on the above theme. Comparing the tuna fisheries to a period in the U.S. history when wild cows went almost extinct, Prof. Suenaga stressed that excessive competition does not promise any future for an industry depending on the natural ecosystem. What follows is a summary of his lecture.

From spring and summer last year, we saw frequent media reports on tunas. As the trade sanctions by international tuna fisheries management organizations (RFMOs) against Chinese Taipei which did not comply with international management measures, including those of the International Commission for the Conservation of Atlantic Tuna (ICCAT), began to take concrete shape, the Chinese Taipei government announced in June last year that it would reduce a total of 186 large-size tuna longline fishing vessels. In point of fact, Chinese Taipei has by now reduced 160 of its vessels.

Subsequently, at the annual meeting of the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) held in October in Miyazaki, Japan, the catch quotas for Japan, the Republic of Korea and Chinese Taipei were curtailed. The meeting also decided to verify the estimation method for catch volume of farmed southern bluefin tuna in Australia.

Furthermore, at the ICCAT annual meeting in November, bluefin tuna catch quotas for the Eastern Atlantic, including the Mediterranean, were reduced. ICCAT also decided on a series of measures, including gradual reduction of quotas over the coming five years.

Amid these circumstances, mass media fanned the sense of crisis that the day may come when we will not be able to eat tunas any longer.

In addition, since around 2004, uncertainty over future supply of tunas arose throughout the world, and prices of fuel, a major operational cost of fishing activities, kept soaring as a result of expanded demand for petroleum in China and other countries. These factors caused tuna fishing business to suffer continuous deterioration not only in Japan but other countries.

There is another factor affecting tuna fisheries business. BSE, which broke out in Britain in 1986 and in the United States in 2003, as well as the avian flu, which first occurred in 1997 and has raged since 2003, gave significant impacts on food life on a global scale.

Under such circumstances, the situation surrounding tunas in recent years was summarized at the Joint Tuna RFMO meeting held in Kobe, Japan, in January this year. The discussion at the meeting included (1) significance and the need to continue the joint tuna RFMO meeting in the years ahead; (2) the fact that the utilization of tuna resources is approaching its limit worldwide; (3) the difference of the position between advanced fishing nations and developing nations regarding access to tuna resources is causing a new problem how to allocate limited catch quota fairly and properly; and (4) the difference of

approach to resource management for fisheries using different fishing methods, such as longline and purse seine. As a result, it was agreed at the meeting that regional tuna fisheries management organizations should closely coordinate among themselves to cope with the above issues.



Prof. Suenaga

To date, tuna production has largely been limited to harvesting in the wild. Now, however, complete farming methods have been developed in Japan, and tuna farming business has been on the rise in Australia, the Mediterranean and Mexico, with Japanese interest involved in it. Tuna farming overseas has been developed and conducted for supplying tunas to the Japanese market.

With regard to consumption, demand for tunas in Japan, the country known to have the largest sashimi market in the world, has almost hit the ceiling recently and the tuna price has been stagnant. This change, coupled with the trend to make farmed tuna the main pillar of profit in business, is beginning to shake the tuna business as a whole.

Under these circumstances, the international situation surrounding tunas in the future is deemed to influence resource management, compliance with international regulations, trade and market distribution.

It has been one of the characteristics of tuna trading in Japan that dealers were not exposed to the risk of currency fluctuations as transactions have been carried out on the basis of yen-denominated prices.

In recent years, it has been pointed out that Japan's monetary policy to restrain interests at an extremely low level is prompting the yen's depreciation against the U.S. dollar or Euro. Amid this situation, Japanese buyers are often being outbid in the international seafood market as "sushi" gained an increasing popularity around the world and has become an internationally recognized food item. On the other hand, Japan's economic recovery has not been felt as a reality on ordinary consumer's level. Even amid feeling of tight supply, the consumer prices of tunas receded to the previous level after a temporary rally last year, because demand was not strong enough. Only high-grade tunas, such as bluefin and southern bluefin, remained at high price levels as the amount

distributed in the market decreased and the prospect has emerged for reduced supply in the years ahead. In response to this trend, foreign farmed tuna businesses are reportedly demanding for higher prices.

Lesson from wild cow resources in the U.S.

In order to grasp accurately the international situation surrounding tunas, I would like to consider the future of tuna resources based on the precedent involving changes of stock farming, in the age when the plains in the U.S. Midwest abounded with the cows that were introduced as domestic cattle from Europe by the Spaniards and became wild after they were abandoned in the wake of the Mexican Independence War. I take this example because I think it can provide some perspective to our discussion on tuna issues.

In the United States, a great number of people competed to flock around the cow resources, as if to take part in the sharing of profit. Some tried to make a fortune at one stroke, and abundant capital flowed in from the Eastern region of the country. Eventually, cow prices collapsed because of excessive supply, and bankruptcies followed, causing the market to fluctuate violently in the middle to late 1800s. In that process, technological renovations of many kinds were introduced, transforming stock farming of cattle at a rapid pace. Excessive competition among producers and market expansion are considered to have brought forth such a transformation.

Turning back to the issue of tunas, we can question what will happen to tuna fishing and its related industries. Will the tuna business able to maintain the high-price sashimi market as in previous years and continue to use the resources sustainably for the ever-spreading canned tuna market? Or will it follow the same way as Atlantic farmed salmon business set a precedent? In the case of Atlantic salmon, farming business is apparently prevailing over harvests of salmon in the wild.

It is recognized internationally that tunas, a highly migratory species, should be conserved and managed through cooperation among countries concerned pursuant to Article 64 of the United Nations Convention on the Law of the Sea. But it has been reported that tuna resources are now close to excessive utilization around the globe. Will the countries concerned be able to maintain, through their own efforts, the sustainable utilization of tunas? Or, will tuna follow the same path as wild cows in the United States? In this regard, it can be said that the issues of tunas are now at truly crucial crossroads.

Another aspect. Tuna fisheries and the tuna

industry, on their part, are facing the need to cope with the environmental requirements. In the U.S. Midwest, around 60 million bison (buffaloes), which was an indigenous species to North America, different from the cows introduced from Europe, used to live, but their number was reduced to about 500 individuals at one point, recovering now to around 200,000. Replacing the wild buffaloes, about 94 million of cattle are being raised in the United States at present. In what had been pastures in the past, corn and beans are grown by drawing up waters from Ogallala Aquifer. These corn and beans are used to raise grain-fed cattle.

How should we approach the issue to satisfy both industrial development and the conservation of the environment? How should we cope with the issue of the environment in terms of the ecosystem in which transformation was made from indigenous species (bison) to introduced species (cow)? How should we harmonize the industrial development and the conservation of the earth's environment? It is not an easy task to find a solution that can satisfy everyone.

Moves of International Tuna RFMOs

Draft criteria developed to strengthen RFMO functions at U.N. meeting

The sixth informal consultation of Contracting Parties to the United Nations Fish Stocks Agreement (UNFSA) was held at the U.N. headquarters in New York for two days from April 23.

Taking the occasion of UNFSA consultation, the United States organized an informal follow-up meeting to the Joint Tuna RFMOs meeting in Kobe, Japan, this January.

During the follow-up talk, draft criteria for reinforcement of the functions of RFMOs were virtually developed.

The United States will brush up the draft for circulation to each RFMO.

Discussion on this subject is expected to take place in a meeting of the Indian Ocean Tuna Commission (IOTC) in May.

Regarding implementation of UNFSA, the Secretariat reported that the total number of Contracting Parties has come to 66 as a result of accession by nine new countries: Japan, Slovenia, Estonia, Latvia, Lithuania, Bulgaria, the Czech Republic, Niue, and Trinidad and Tobago.

It was also reported that the Republic of Korea has started the process of accession.