Opinion of the Scientific Panel on Contaminants in the Food Chain on a request from the Commission related to the toxicity of fishery products belonging to the family of *Gempylidae*

(Question N° EFSA-Q-2004-016)

Adopted on 30 August 2004

SUMMARY

Oilfish (*Ruvettus pretiosus*) and Escolar (*Lepidocybium flavobrunneum*) belonging to the family of *Gempylidae* are consumed in several European counties. These two species do not metabolise wax esters that occur naturally in their diet and, as a consequence, these wax esters are stored in the body of these fish. The oil content of the muscle meat of Oilfish and Escolar amounts to 18 - 21 % and the oil contains > 90 % wax esters. The wax esters may cause diarrhoea and other acute gastro-intestinal symptoms in humans following the consumption of meat from these fish species. The symptoms develop rapidly and may be pronounced but usually are not long lasting. From the case reports available, it is not possible to establish an intake level of such fish which will not lead to these adverse effects but proper preparation practices may prevent such incidences.

KEY WORDS

Fish, *Gempylidae* family, Oilfish, *Ruvettus,* Escolar, *Lepidocybium,* wax esters, diarrhoea, gastro-intestinal symptoms

BACKGROUND

At present the Commission is revising the legislation concerning food hygiene in order to introduce modern control methods and clarify the responsibilities of the food establishment operator.

Two of the proposals are the ”Regulation of the European Parliament and of the Council laying down specific hygiene rules for food of animal origin” and the ”Regulation of the European Parliament and of the Council laying down specific rules for the organisation of official controls on products of animal origin intended for human consumption”. Both have obtained the political agreement of all Member States, but still await adoption by the European Parliament. In anticipation of their adoption, implementing measures laying down health standards or checks for fishery products, where there is scientific evidence indicating that they are necessary to protect public health, are in preparation.

In the existing legislation (Council Directive 91/493/EEC1), the placing on the market of poisonous fish belonging to the families of Tetraodontidae, Molidae, Diodontidae, Canthigasteridae and of fishery products containing biotoxins such as ciguatera toxins or muscle-paralysing toxins is forbidden, but no reference to the *Gempylidae* family is made.

In the light of a specific request from a Member State, and considering that some Member States and third countries have already introduced into their legislation a ban on the placing on the market of these fishery products, the Commission considers it prudent to review the current legislation for including fishery products of the *Gempylidae* family in the list of poisonous fish for which the placing on the market shall be forbidden.

TERMS OF REFERENCE

The European Food Safety Authority is asked to assess the effective risk to the consumer from the consumption of fishery products belonging to the family of *Gempylidae*.

ASSESSMENT

The *Gempylidae* family contains five genera. Among these, two genera, each containing one species, are consumed in several European countries, e.g. Oilfish (*Ruvettus pretiosus*) and Escolar (*Lepidocybium flavobrunneum*). Oilfish occurs in the Mediterranean Sea and is widely distributed in tropical and temperate seas of the world. Escolar occurs in tropical and temperate seas of the world, but is probably not occurring in the northern Indian Ocean.

Oilfish and Escolar do not metabolise wax esters that occur in their diet, and as a consequence, they are stored in the body. The wax esters may cause diarrhoea and other acute

[1] Council Directive 91/493/EEC of 22 July 1991 laying down the health conditions for the production and the placing on the market of fishery products. OJ No.L268, 24.09.1991, p 15.

gastro-intestinal symptoms in humans following the consumption of meat from these fish species (see below). Besides containing wax esters, these fish species are also rich in histidine, like fish of the scombroid species (such as tuna, sardine, anchovy or herring). If not stored in a proper way after harvesting, histidine is decarboxylated to histamine by bacteria and consumption of such fish may cause toxicity (commonly known as scombrotoxicosis). The symptoms include rash, urticaria, nausea, vomiting, diarrhoea, abdominal cramps, headache, and flushing. Levels of histamine in raw Escolar in connection to an incident in a restaurant in Stockholm were 1000 mg/kg. Formation of biogenic amines in fish, such as histamine, is a well recognised phenomenon and is not considered further here.

According to the literature, the oil content of the muscle meat of Oilfish and Escolar amounts to 18 - 21 % and the oil contains > 90 % wax esters. In these wax esters, C14 - C22 fatty acids are esterified with fatty alcohols of similar chain length. The wax esters will remain in the cooked fish if the preparation is not performed properly. Consuming 100 g of smoked Escolar or Oilfish would then lead to an exposure of about 20 g wax esters. As human lack the ability to digest wax esters, they will pass through the gastro-intestinal system. During the passage, they may cause diarrhoea and other acute gastro-intestinal symptoms when present in sufficient amounts. The symptoms can be dramatic but are seldom long lasting. Although the exact mechanism behind the effects is not fully understood, they are not considered to be caused by toxicity, as in the case of scombrotoxicosis, but rather by the lack of digestibility of these wax esters.

Several outbreaks of gastrointestinal disturbances due to the consumption of Escolar and Oilfish are reported in the literature. Although individual differences in sensitivity seem to exist, there are no reports elucidating the extent to which these effects occur in the general population or if there are sensitive sub-populations. The case reports leave open the levels of fish intake that are likely to give rise to gastrointestinal disturbances, and it is often not clear from these reports, which species of the Gempylidae family had actually been consumed. The role of possible additional factors, such as freshness of the fish, i.e. histamine content, and allergic reactions to fish proteins, was not clarified.

In a recent case report[2] of 44 persons which had consumed Escolar, 20 developed symptoms. Of these 20 symptomatic persons, 80 % showed “oily” diarrhoea, 50 % gastrointestinal cramps, 35 % headache and 25 % vomiting. Two fish samples analysed had an oil content of 22 %, of which 97 % were wax esters.

The causality between the consumption of the two species of fish belonging to the family *Gempylidae* and diarrhoea and other gastrointestinal disturbances is supported by observations in a small number of experiments with rats, where similar effects occurred but seborrhoea was present in addition to the symptoms seen in humans.

The Panel noted that due to the effects attributed to these two species of the *Gempylidae* family, Italy and Japan have issued a ban on the import and placing on the market of these species. In 1999, the Swedish and the Danish National Food Administrations informed the

[2] Yohannes, K. *et al*.: An outbreak of gastrointestinal Illness asociated with the consumption of Escolar fish. Commun. Dis. Intell. 26, No 3, 441-445 (2002)

Swedish National Fish Trade Association and the Danish fish importing companies respectively about the problems these fish could cause if not treated and cooked properly and issued recommendations[3]. The German federal Institute for Risk Assessment (BfR) has also published information concerning potential problems in connection with the consumption of these species of fish. However, poisonings due to the consumption of these fish have not been reported officially in Germany.

In the literature there are a few other species of fish that are reported to have unusually high oil content. The oil in these species does not contain wax esters to any great extent but triglycerides, diacylglyceryl ethers or squalene. One of these species is Black ruff (also called Rudderfish), *Centrolophus niger,* a deep-water fish found in the Mediterranean and in northern and southern oceans but more seldom in tropical parts of the oceans Another species with possibly similar properties is Tasmanian rudderfish (also called Flabby driftfish, Mauve ruffe or Tasmanian ruffe), *Tubbia tasmanica.* It is also a deep-water fish but it is only found in southern oceans There is no information on to what extent these species are found on the European market.

CONCLUSIONS

Human case reports suggest an association between the consumption of two fish species belonging to the family *Gempylidae* (Oilfish and Escolar) and diarrhoea and other gastrointestinal disturbances. The symptoms observed after consumption of these fish develop rapidly and may be pronounced but usually are not long lasting. Some case reports indicate a variation in sensitivity between individuals. The effects are likely to be caused by wax esters and/or other oily compounds naturally present in the meat of these fishes. From the case reports available, it is not possible to establish an intake level of such fish which will not lead to these adverse effects. Proper information on the potential adverse effects of consumption of Oilfish and Escolar and their proper preparation practices may prevent the occurrence of adverse reactions after consumption of these fish.

SCIENTIFIC PANEL MEMBERS

Jan Alexander, Herman Autrup, Denis Bard, Angelo Carere, Lucio Guido Costa; Jean-Pierre Cravedi, Alessandro Di Domenico, Roberto Fanelli, Johanna Fink-Gremmels, John Gilbert, Philippe Grandjean, Niklas Johansson, Agneta Oskarsson, Andrew Renwick, Jirí Ruprich, Josef Schlatter, Greet Schoeters, Dieter Schrenk, Rolaf van Leeuwen, Philippe Verger.

[3] The fish must be prepared in such a way that most of the fat could be separated from the dish. The cooking liquid must not be used for preparation of sauce. Cooking recommendations must be available where they are offered for sale. Due to their high content of histidine the storage time should be kept short and the storage conditions should be adjusted accordingly. (Translation from Swedish)

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