

## ADVISORY COMMITTEE ON NOVEL FOODS AND PROCESSES

## DHA RICH MICROALGAL OIL: EXTENSION OF USE

**Issue**

The Committee is asked to consider an initial opinion from the German Competent Authority on an application to extend the uses of DHA-rich algal oil derived from the microalgal *Ulkenia sp.* as a novel ingredient, under the Novel Foods Regulation (EC) No. 258/97.

The Committee is asked whether it agrees with this initial opinion and whether they have any further comments to make on the application.

**Introduction**

1. On 4 April 2005, the European Commission forwarded the German Competent Authority (CA)'s initial opinion on the application made under Article 4(1) of Regulation (EC) No 258/97 from the company Nutrinova.
2. The German CA has raised questions regarding the potential high consumption level of DHA and on this basis has issued a negative opinion to extend the authorisation of this novel food in the EU. The dossier has therefore been referred to the European Food Safety Authority. Although other Member States have not been formally asked to comment on the initial opinion, there is an opportunity to raise any additional points that need to be taken into account in EFSA's opinion.
3. A translation of the German Initial Assessment Report and the full dossier from the applicant are attached respectively as Annexes **A** and **B**.

**Background**

4. Reports in the scientific literature indicate that increased DHA intake could protect against inflammatory or cardiovascular diseases and have a moderating effect on the course of rheumatoid arthritis and psoriasis. In 2001-2002 the ACNFP considered an application for the authorisation of DHA-rich oil obtained from the microalga *Schizochytrium sp.*, as a novel food ingredient (ACNFP 49/1, 54/2 and 55/1). The UK CA submitted a favourable initial opinion to the Commission in June 2002, and the product was authorised in June 2003<sup>1</sup>, albeit with a reduction in the number of food categories compared with the application and the initial opinion. A copy of the Committee's initial opinion on this application is attached in Annex **C**.

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<sup>1</sup> Commission Decision of 5 June 2003 authorising the placing on the market of oil rich in DHA (docosahexaenoic acid) from the microalgae *Schizochytrium sp.* as a novel food ingredient under Regulation (EC) No 258/97 of the European Parliament and of the Council (2003/427/EC)

5. In November 2003 Nutrinova notified the Commission of its intention to market their DHA-rich oil obtained from the microalgae *Ulkenia sp.* in accordance with Article 5 of the Novel Food Regulation (EC) 258/97, after obtaining a positive opinion from the German CA that the oil from *Ulkenia sp.* was equivalent that from *Schizochytrium sp.* This opinion was considered by Members in 2004 (ACNFP/64/7) and, whilst no specific safety concerns were raised, there were reservations that the criteria for equivalence were not met. In particular members highlighted that although the two sources are related algal species, they are from different genera.
6. At present Nutrinova can add their DHA-rich oil to dairy products (except milk-based drinks), dairy analogues (except drinks), spreadable fat and dressings, breakfast cereals, food supplements, dietary foods for special medical purposes and food intended for use in energy-restricted diets for weight reduction. This is in line with the authorisation for the DHA-rich oil from *Schizochytrium sp.*.
7. Nutrinova proposes to extend the range of food categories to include to a range of bread, bakery products, fats and oils, nutrition bars, non-alcoholic non carbonated water based flavour drinks, fruit juiced based drinks and dairy based beverages.
8. In accordance with the Novel Foods Regulation (EC) 258/97, Nutrinova's DHA-rich oil has been classified as a complex novel food from non-GM sources source (class 2.2). Nutrinova prepared its application pursuant to the scheme set out in Commission Recommendation 97/618/EC, which requires the following data for this class of product:

<b>I</b>	<b>Specification of the NF</b>	<b>X</b>
<b>II</b>	<b>Effect of the production process applied to the NF</b>	<b>X</b>
<b>III</b>	<b>History of the organism used as the source of the NF</b>	<b>X</b>
IV	Effect of the genetic modification on the properties of the host organism	-
V	Genetic stability of the GMO	-
VI	Specificity of expression of novel genetic material	-
VII	Transfer of genetic material from GM microorganisms	-

VIII	Ability to survive in and colonise the human gut	-
<b>IX</b>	<b>Anticipated intake/extent of use of the NF</b>	<b>X</b>
<b>X</b>	<b>Information from previous human exposure to the NF or its source</b>	<b>X</b>
<b>XI</b>	<b>Nutritional information on the NF</b>	<b>X</b>
<b>XII</b>	<b>Microbiological information on the NF</b>	<b>X</b>
<b>XIII</b>	<b>Toxicological information on the NF</b>	<b>X</b>

## **I Specification of the Novel Food (NF)**

Annex B p. 15-43

9. The applicant has described their DHA-rich oil as a colourless or pale orange refined oil containing 45% (w/w) of total fatty acids. Compositional analyses provided in the application confirms that the DHA-rich oil meets the specification described in Commission Decision 2003/427/EC (Annex D). Members may wish

to note that, compared with the published specification for the earlier product derived from *Schizochytrium sp.*, the level of unsaponifiables is lower (1.2% v not more than 4.5%) and the mean content of DHA is greater (45.5% v not less than 32.0%).

10. The German CA has noted that the levels of lead, cadmium, copper and iron in pilot and production batches comply with the requirements laid down in the draft Codex Standard for refined vegetable oils (ALINORM 99/17 at step 8) and the limits set in the Regulation applying to lead contamination, Regulation (EC) No.466/2001.
11. The applicant has evaluated the stability of their DHA-rich oil, which was stored at 5° under nitrogen atmosphere for 24 months. This showed no significant changes in the percentage of total fatty acids and the applicant concluded that DHA-rich oil is stable in these storage conditions. In order to check the stability in final products the applicant analysed DHA levels in dietary supplements stored at 25° for up to 12 months. These analyses showed constant levels of DHA. The applicant concludes that these results along with a short market survey from 2003 have indicated DHA-rich oil to be stable.
12. The German CA has not commented on the specification of the DHA-rich oil from *Ulkenia sp.* as this was previously shown to comply with the specification of the authorised DHA-rich oil from *Schizochytrium sp.*

## **II Effect of the production process applied to the NF**

Annex B p. 44-47 **CONFIDENTIAL**

13. DHA-rich oil from *Ulkenia sp.* is produced by a process involving fermentation, extraction and refining. A culture containing *Ulkenia sp.* is first fermented then extracted (using hexane) from the dried biomass, to produce crude DHA-rich oil. The crude DHA-rich oil is then refined using a standardised food-oil refining process. To prevent oxidation the DHA-rich oil is stabilised by the addition of approved antioxidants, normally in the form of a natural tocopherol mix which conforms to the purity criteria for the food additive E306. The NI is then transported in suitable food storage containers and stored at 5° under nitrogen.
14. The German CA has made no comment on the production process for the NI as the product had previously been shown to be equivalent to the authorised DHA-rich oil derived from *Schizochytrium sp.*

## **III History of the organism used as the source of the NF**

Annex B p. 47-48

15. DHA-rich oil is derived from the microalgae *Ulkenia sp.* and obtained via a fermentation process. *Ulkenia sp.* belongs to the kingdom Chromista and the applicant has provided a summary of the taxonomical classification of *Ulkenia sp.* on page 47 of Annex B. *Ulkenia sp.* and *Schizochytrium sp.* are from the family Thraustochytriaceae. Neither has a history of being used traditionally in food but these types of microalgae are often indirectly consumed in association with seafood such as mussels, crabs and fish.
16. The German CA has made no comment on the history of organism used as the novel food source.

## IX Anticipated intake and extent of use of the NF

Annex B p. 54-63

17. The use of DHA-rich oil from *Ulkenia sp.* is already permitted in a range of food categories as (see paragraph 7). The applicant now intends to extend the range for food categories to include those described below.

Food Category	Proposed food use	Maximum level of DHA
Bakery products	Bread*	50mg/100g
	Bread rolls*	
	Cakes*	
	Cookies*	
	Biscuits*	
Fats & oils	(not for frying)	600mg/100g
Nutrition bar	On the basis of dried fruits, grains, protein, cocoa and/or nuts (including energy bars)*	50mg/100g
Non alcoholic beverages	Non-alcoholic, non-carbonated, Water-based flavoured drinks (including energy drinks, sports drinks)	30mg/100ml
	Fruit-juice based drinks* (excluding fruit nectars or fruit juices)	
	Dairy/dairy analogues-based beverages*	

18. Members should note that all categories marked \* were included in the original application for DHA rich oil from *Schizochytrium sp.* and were covered by the ACNFP initial opinion in 1992 (Annex C) The UK opinion for this application was positive and Members did not raise any concerns regarding over the inclusion of these food categories.
19. The applicant has estimated the potential dietary intake of DHA *per se* and the DHA-rich oil using consumption data from the Dutch National Food Consumption Surveys (DNFS). The German CA have noted that the consumption data provided by the applicant for the intended product lacks the necessary detail. The German CA therefore looked at the potential consumption of the novel ingredient using domestic consumption figures and concluded that the applicants' consumption data underestimates the potential levels of consumption (Annex A p4).
20. The potential intake of DHA was evaluated when the ACNFP evaluated the DHA-rich oil from *Schizochytrium sp* (Annex C, p4). These data indicate that the predicted average level of intake of DHA from all categories, including background consumption, would be 550mg per day in adults. This figure was obtained using all the food groups covered by the original application, which includes those highlighted in the above table.

## **X Information from previous human exposure to the NF or its source**

Annex B p. 64-65

21. The applicant is currently permitted to market DHA-rich in the EU. The applicant has stated that there has been no reported adverse effect associated from the consumption of products containing DHA-rich oil from *Ulkenia sp.*. The applicant has not supplied any data that detail the extent of sales.
22. In addition to the novel algal sources, the principal sources of DHA in the diet are fish, especially oily fish. However, according to the British Nutrition Foundation on average adults in the UK are eating a third of a portion of oily fish per week and 70% of adults eat no fish at all.
23. The German CA has not commented on extent of previous human exposure.

## **XI Nutritional information on the Novel Food**

Annex B p. 66-70

24. DHA is considered to play an important role in maintaining a healthy heart or reducing several risk factors contributing to cardiovascular disease. These include reducing triacylglycerol levels and platelet aggregation. DHA is also considered to be an important constituent required in the development and function of the brain and retina. An intervention study carried out on 112<sup>2</sup> vegetarians demonstrated that a daily dose of 1g of DHA (from 2.29g of DHA-rich oil) significantly increased DHA content in blood serum levels and erythrocytes and decreased triglyceride levels.
25. Recommendations on the intake of long chain n-3 PUFA<sup>3</sup> in the adult population vary and the applicant has summarised the international recommendation (Annex B p.12). In 2004 the Scientific Advisory Committee on Nutrition (SACN) issued updated advice on fish consumption after considering the recommendations previously made by the UK's Committee on Medical Aspects on Food Policy (COMA) in 1994. SACN endorsed COMA's recommendations that individuals should eat at least two portions of fish per week and the current UK recommendation is that the population's average consumption of long chain n-3 PUFA should increase from about 0.1g/d to about 0.2g/d.
26. In their initial assessment report the German CA highlight that as of yet there is no recognised maximum daily intake for omega 3 (n-3) fatty acids. However, the EFSA Panel on Dietetic Products, Nutrition and Allergy is currently discussing the health benefits of omega 3 fatty acids, authorisation of a health claim and maximum desirable intakes from all food sources.

## **XII Microbiological Information**

Annex B p. 71

27. DHA-rich oil is the product of a microbiological fermentation process. According to the applicant there is no indication that the product strain *Ulkenia sp.* is pathogenic or exhibits any other risk concerning health. The applicant has evaluated the total viable count and coliform bacteria of the DHA-rich oil which both showed to be <0.1 cfu/g.

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<sup>2</sup> incorrectly stated to be 114 in the German opinion

<sup>3</sup> PUFA: polyunsaturated fatty acids

28. The applicant has provided analyses of 3 pilot batches of DHA-rich oil which all showed the absence (at the limit of detection) of algal and cyanobacterial toxins such as domoic acid, paralytic shellfish poison, diarrhoeic shellfish poison and microcystins/nodularin. The applicant also provided scientific reports on the safety of *Ulkenia sp.*, which all show the absence of any instances of toxin formation by *Ulkenia sp.*. This view has been supported by a statement from Dr Melkanian from the University of Cologne who stated that toxins are not formed by *Ulkenia sp.* and it is therefore not expected that algal toxins would be present in the oil.
29. The German CA considers the microbiological status of DHA-rich oil to be satisfactory.

### **XIII Toxicological information**

Annex B p.72-77

30. The applicant has submitted a review by an independent toxicologist of the safety data on DHA-rich oil. The studies included an acute toxicity study in rats, a sub-chronic 90-day feeding study where rats were fed DHA-rich oil derived from *Ulkenia sp.*, and a single generation study on reproductive toxicity in rats.
31. Members will wish to note that in their initial opinion on DHA-rich oil derived from *Schizochytrium sp.* the Committee concluded that the toxicological information provided supported its safety and provided reassurance of the safety of the DHA-rich oil ingredient.
32. The German CA has concluded that a safe upper limit for intake of DHA cannot be derived from the application dossier. It suggests that daily DHA intake from all sources should be restricted to 1.5g, referring to reports that DHA supplementation leads to increased LDL-cholesterol and reports of other potential adverse effects. The opinion notes that the proposed level of addition of DHA-rich oil to drinks and to bread and bakery wares is likely to lead consumers to exceed the proposed limit of 1.5 g/day.
33. The assessment report also indicates that normal intake of long chain n-3 PUFA from foodstuffs is up to 0.6 g/day and consumers should therefore be advised, through labelling, not to consume more than 0.9 g per day of additional long chain n-3 fatty acids. It suggests that this recommendation should also apply to the previously authorised DHA-rich oil although it does not mention DHA from other sources e.g. fish oils. In most cases this information will be mandatory under the nutrition labelling directive 90/496/EEC.

### **Committee Action Sought**

34. The Committee is invited to consider this application dossier and to comment on the German Competent Authority's opinion. As members have already issued a positive opinion for equivalent DHA-rich oil, comments should be restricted to issues that have come to light since this opinion was issued in 2002 or apply to this application only.
35. This application is being referred to the European Food Safety Authority in order that the issue of high level of consumption can be clarified. Any additional concerns raised by Members will be passed on to EFSA, so that they can be addressed in the course of its further assessment.

**Annexes attached**

**Annex A:** A translation of the German Competent Authority's Initial Assessment report on the application made by Nutrinova to place on the market additional uses of DHA-rich oil from the microalgae *Ulkenia sp.* **RESTRICTED**

**Annex B:** Application dossier on the request for approval on the additional uses of DHA-rich oil from the microalgae *Ulkenia sp.* **RESTRICTED**

**Annex C:** Initial Assessment Report on the application under the Novel Food Regulation from OmegaTech for the clearance of DHA Gold™, a DHA rich oil.

**Annex D:** Commission Decision of 5 June 2003 authorising the placing on the market of oil rich in DHA (docosahexaenoic acid) from the microalgae *Schizochytrium sp.* as a novel food ingredient under Regulation (EC) No 258/97 of the European Parliament and of the Council (2003/427/EC)

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Initial Assessment Report on the application under the Novel Food Regulation from OmegaTech for the clearance of DHA Gold™, a DHA rich oil.

This document can be found at:

<http://www.food.gov.uk/multimedia/pdfs/omegafinalopinion.pdf>

**Secretariat  
May 2005**

**ADVISORY COMMITTEE ON NOVEL FOODS AND PROCESSES**

Commission Decision of 5 June 2003 authorising the placing on the market of oil rich in DHA (docosahexaenoic acid) from the microalgae *Schizochytrium sp.* as a novel food ingredient under Regulation (EC) No 258/97 of the European Parliament and of the Council (2003/427/EC).

This document can be found at:

[http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l\\_144/l\\_14420030612en00130014.pdf](http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l_144/l_14420030612en00130014.pdf)

**Secretariat  
May 2005**