



---

**Committee of Experts on the Transport of Dangerous Goods  
and on the Globally Harmonized System of Classification  
and Labelling of Chemicals****Sub-Committee of Experts on the Transport of Dangerous Goods****Forty-seventh session**

Geneva, 22 – 26 June 2015

Item 3 of the provisional agenda

**Listing, classification and packing****Fish meal (fish scrap), stabilised (UN 2216): Class 9****Transmitted by the International Fishmeal and Fish Oil organization  
(IFFO)<sup>1</sup>****Purpose**

1. The purposes of this document are:
  - To propose the harmonisation of the IMDG Code Special Provision (SP) 945 with the United Nations Model Regulations on the Transport of Dangerous Goods;
  - To seek the opinion on the proposed fish meal stability tests that would demonstrate the safe use of alternative antioxidants and/or blends and adjusted concentrations to stabilise fish meal.

**Introduction**

2. In the Dangerous Goods list, fish meal, stabilised is currently listed under entry UN 2216, Class 9, packing group III. One of the special provisions (SP 308) states that fish meal shall contain at least 100 ppm of antioxidant (ethoxyquin) at the time of consignment.

---

<sup>1</sup> In accordance with the programme of work of the Sub-Committee for 2015–2016 approved by the Committee at its seventh session (see ST/SG/AC.10/C.3/92, paragraph 95 and ST/SG/AC.10/42, para. 15).

## Background

3. Stabilising fishmeal by addition of the anti-oxidant, ethoxyquin (EQ) has been done for many years. The addition levels of ethoxyquin were determined more than 20 years ago. However, there is insufficient information available regarding the depletion rate of ethoxyquin after addition and the optimum level of ethoxyquin at the time of shipping which will ensure safe shipping. Unnecessarily high levels of ethoxyquin are undesirable and will lead to high residue levels in the animal which has been fed with the treated fishmeal. In addition ethoxyquin has been used as a fungicide to prevent the development of blight or scald on pears but its use for this purpose has not been authorised within the European Union and therefore its presence in food via the animal feed chain is controversial and generally undesirable.

4. Increased negative publicity in the European Union and difficulties with high levels of ethoxyquin found in shrimp originating from Asian countries exporting to Japan has drawn attention to the use of ethoxyquin. In addition, the potential carry-over of fat soluble ethoxyquin into omega-3 oils produced from by-products of farmed fish is also a cause for concern.

5. There are strict rules regarding the safe shipping transport of fishmeal that have been put in place by the Sub-Committee in the European Union Model Regulations and the International Maritime Organisation (IMO) as seen in the IMSBC (International Maritime Solid Bulk Cargoes) code and IMDG (International Maritime Dangerous Goods) code.

6. According to the Recommendations on the Transport of Dangerous Goods: Model Regulations (18th revised edition) the following Special Provision is made for fishmeal:

308 Fish scrap of fish meal shall contain at least 100ppm of antioxidant (ethoxyquin) at the time of consignment.

7. However in the IMDG Code there is also the following additional Special Provision 945 (in addition to SP 308):

945 Stabilization of fishmeal shall be achieved to prevent spontaneous combustion by effective application:

- Of between 400 and 1000 mg/kg (ppm) ethoxyquin, or liquid BHT (butylated hydroxy toluene); or
- Between 1000 and 4000 mg/kg (ppm) BHT in powder form at the time of production.

The said application shall occur no longer than twelve months prior to shipment.

8. The IMDG Code SP945 was not referred back to the Model Regulations (18th revised edition). SP 945 includes BHT as antioxidant which is not mentioned in the Model Regulations. Clarification on the use as well as the level of antioxidants is required.

9. In 2003 the European Commission announced its intention to simplify the existing legislation concerning feed additives which resulted in the European Parliament and Council Regulation (EC) No 1831/2003 that sets out new rules for the authorisation, supervision and labelling of feed additives. The implication of Regulation (EC) No 1831/2003 was that only additives that have been through an authorisation procedure may be placed on the market and all additives will have to apply to be re-authorised for specific animal species, specific conditions of use and authorisation would have to be renewed every ten years.

10. A consortium under the umbrella of FEFANA (European Union Association of Specialty Feed Ingredients and their Mixtures) submitted the ethoxyquin re-authorisation

application dossier in September 2010. The European Food Safety Authority (EFSA) who will provide an Opinion on EQs safety has since asked for additional information regarding the safety of ethoxyquin and its breakdown products as well as analytical methods. Ethoxyquin can be used as an antioxidant in feed at current practises until the EFSA opinion and subsequent European Union regulation has been published, which will either authorise its use or amend, suspend or revoke the use of ethoxyquin.

11. IFFO realises the importance of ethoxyquin to the industry and also the urgency of verifying the use of alternatives to ethoxyquin should it not be re-authorised. The intention is to produce scientific data that could be presented to the United Nations Sub-Committee of Experts on the Transport of Dangerous Goods and IMO thereby resulting in the inclusion of the alternative antioxidant into the IMO shipping codes.

12. Trials will be performed with a reactive fishmeal such as anchovy meal produced at a selected factory. Samples will be treated with two different levels of ethoxyquin, the current level and a dosage level less than the current minimum dosage level of 400 mg/kg to determine if a lower concentration of ethoxyquin will effectively protect the fishmeal. In addition fishmeal will be treated with a synthetic and possibly a natural antioxidant to investigate the efficacy of possible alternative antioxidant options.

## Proposed antioxidant efficacy trials

13. Objectives:

- To determine if a lesser dosage amount of EQ will provide long term protection of fishmeal;
- To determine if an alternative option for EQ is viable in terms of efficacy as well as economically.

14. The same batch of highly polyunsaturated fishmeal such as anchovy meal will be used for the samples. Treatments will be handled and stored under similar conditions that fishmeal is normally handled in the factory.

15. The following treatments of the fish meal samples are planned:

- Fishmeal dosed with 600 mg/kg EQ (general dosage level);
- Fishmeal dosed with 300 mg/kg EQ (below minimum IMO level of 400 mg/kg);
- Fishmeal dosed with alternative antioxidant blend (e.g.1000 mg/kg synthetic antioxidant such as BHT and propyl gallate mix);
- Fishmeal dosed with alternative antioxidant blend (e.g.2000 mg/kg synthetic antioxidant such as BHT and propyl gallate mix);
- Natural antioxidant alternative dosed at recommended levels.

16. Experimental detail:

Each treatment will be performed on a 50kg sack of highly reactive fishmeal such as anchovy meal and each treatment will be performed in duplicate in an accredited laboratory. The trial will be performed in a fishmeal producing factory in Chile.

Total amount of fishmeal needed of each different fishmeal type:

50kg x 6 treatments x 2 duplicate = 600 kg (12 bags of fishmeal)

17. Storage conditions and sampling: The fishmeal bags will be stored in conditions that simulate normal storage conditions such as limited ventilation at ambient temperature

(roughly 25°C). The fishmeal will be stored in 50kg breathable bags and the bags for each sample treatment will be stacked in one stack. If possible, the temperature should be monitored at regular intervals during the storage trial throughout each sample type stack as an increase in temperature indicates increased oxidation which could lead to spontaneous combustion. The storage facility will have to be safe and secure and will need to be able to withstand a possible fire-risk. Representative samples will be taken during storage by inserting a sampling stick into the sacks in various points.

18. Sampling intervals: Day 0, Week 2, Month 2, Month 6, and Month 12. The following analyses will be performed throughout the trial:

- Anti-oxidant content (AO): Ethoxyquin content, Alternative antioxidant (e.g. BHT/Blend, Natural antioxidant)
- Peroxide value (PV) (primary oxidation)
- Anisidine value (AV) (secondary oxidation)
- Free fatty acids (FFA) (hydrolytic activity – enzymes)
- Omega-3 content (PUFA) (indication of oxidative deterioration of fatty acids)

19. Table 1: Proposed Project Plan

<i>Treatment</i>	<i>Sampling intervals</i>				
	<b>Day</b>	<b>Month</b>			
	<b>0</b>	<b>14</b>	<b>2</b>	<b>6</b>	<b>12</b>
600 ppm EQ (concentration tbc)	AO x 5, PV, AV, FFA, PUFA	AO, PV, AV, FFA.	AO, PV, AV, FFA	AO, PV, AV, FFA.	AO, PV, AV, FFA, PUFA
300 ppm EQ (concentration tbc)					
1,000 ppm BHT/Propyl gallate blend (AO mix to be confirmed)					
2,000 ppm BHT/ Propyl gallate blend (AO mix to be confirmed)					
Natural antioxidant: Concentration A					
Natural antioxidant: Concentration B					

20. The even distribution of the antioxidants will be verified by performing 5 samplings throughout each treatment bag of fishmeal after dosing on Day 0.

21. The PUFA content will only be performed on Day 0 as well as the final time-interval since the total amount of PUFAs declines at a very slow rate.

22. The trial results will be documented along with the conclusions drawn and will be presented to the UN Committee of Experts on the Transport of Dangerous Goods.

23. It is foreseen that additional storage trials in different countries (e.g. South Africa and United States of America) with different raw materials is will be performed to complement the currently planned storage trial. Once available the data from all the trials

will be collated and presented to the United Nations Committee of Experts on the Transport of Dangerous Goods along with the initial trial results.

24. It is intended that the trial(s) will provide sufficient proof to include alternative antioxidants or blends as safe alternatives to ethoxyquin and BHT in the United Nations Model Regulations on the Transport of Dangerous Goods and ultimately will be included in the IMDG code.

---