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| **UN/SCETDG/48/INF.9** |

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| **Committee of Experts on the Transport of Dangerous Goods  and on the Globally Harmonized System of Classification and Labelling of Chemicals 9 November 2015** | |
| **Sub-Committee of Experts on the Transport of Dangerous Goods** |  |
| **Forty-eighth session** |  |
| Geneva, 30 November – 9 December 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)

1. This document provides an update with reference to ST/SG/AC.10/C.3/2015/14 of the forty-seventh session of the Sub-Committee of Experts on the Transport of Dangerous Goods held 22 – 26 June 2015 which was 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.

2. Comments from the Sub-Committee were taken into account and where possible the protocol was adjusted. In summary these were comments from the committee with the relevant action taken by IFFO.

(a) The analytical tests proposed does not relate to the “Self Heating Test” that is required in the UN Model Regulations and IMO codes to show that fishmeal is safe for transport.

*Response: The oxidation tests are one step ahead of the self-heating test and if there is little oxidation then self –heating would not occur. However, all efforts have been made to include the “Self-heating test” as part of our analyses and it will be performed at intermediate intervals during the storage period. .*

(b) It was suggested that larger volumes of fishmeal should be stored which would be more in line with bulk transport conditions which will allow results relevant to actual transport conditions. It was felt that the 50kg storage volume is too different from real life shipping conditions to relate the results to actual conditions.

*Response: After discussion with fishmeal producer members it was clear that the majority of fishmeal is shipped in 50kg bags however parallel storage using 1,000kg bags will be included for the instances where larger shipping volumes are used. The larger bags will be analysed at lesser intervals and results will be compared between the two storage volumes to ascertain whether the volume has an influence on the rate of oxidation.*

(c) The temperature difference makes it hard to compare results. The shipping hold conditions often reach temperatures of 50 - 60°C and lower temperatures might not show real deterioration.

*Response: We will take ambient temperature readings (as well as temperature in fishmeal) to be able to compare storage conditions. It is very difficult to store bulk samples of fishmeal at elevated temperatures and at this stage unfortunately does not seem possible. The storage samples will be covered with polypropylene covers in an attempt to increase the temperature.*

3. The trial in Peru, South America commenced in July 2015. Results of three test intervals of the trial in Peru have been obtained and are shown in Table 1. The Ethoxyquin treatment 600 ppm (50 kg as well as 1000 kg) show values highlighted in red where a problem had occurred during dosage. Instead of the intended 600 ppm ethoxyquin dosage only a minimal amount of roughly 30 - 50 ppm ethoxyquin has been added to the fishmeal treatment sample.

4. The primary and secondary oxidation parameters, peroxide value and anisidine value, showed initial high values which decreased by Month 2. The initial high values often occur during the early stages of storage and rapid oxidation of very highly polyunsaturated reactive fishmeal. Reactive fishmeal that has not been treated with antioxidants has shown to have peroxide values of 100- 125 meq/kg during the initial stages of storage.

5. The free fatty acids (FFA) are formed by hydrolytic activity either prior to processing in the raw material or during heating during processing and in addition during storage because of complex breakdown processes. An increase in FFA value during storage will provide an indication of increased hydrolytic activity.

6. Results for the self-heating test are not available at this date.

7. Additional trials in South Africa, USA and Chile are in the pipeline depending on the availability of fish and therefore fishmeal.

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| **Table 1: Preliminary results of fishmeal trial in Peru** | | | | | | | | |
| **Parameters** | **Storage size** | **Treatments** | **MONTH** | | | | | |
| **0** | | **0.5** | **2** | **6** | **12** |
| 09/07/2015 | | 23/07/2015 | 09/09/2015 | 09/01/2016 | 09/07/2016 |
| Ethoxyquin (ppm) | 50 kg bags | EQ 300 ppm | 328 | 307 | 322 | 282 |  |  |
| EQ 600 ppm | 27 | 30 | 31 | 32 |  |  |
| 1000 kg big bag | EQ 300 ppm | 284 | 310 |  | 240 |  |  |
| EQ 600 ppm | 51 | 44 |  | 55 |  |  |
| BHT blend (ppm) | 50 kg bags | BHT 2000 ppm | 434 | 442 | 476 | 346 |  |  |
| BHT 4000 ppm | 837 | 879 | 865 | 714 |  |  |
| 1000 kg big bag | BHT 2000 ppm | 441 | 435 |  | 377 |  |  |
| BHT 4000 ppm | 875 | 858 |  | 776 |  |  |
| Tocopherol blend (ppm) | 50 kg bags | TocP 2000 ppm | 374 | 396 | 344 | 338 |  |  |
| TocP 4000 ppm | 626 | 630 | 566 | 562 |  |  |
| 1000 kg big bag | TocP 2000 ppm | 389 | 410 |  | 368 |  |  |
| TocP 4000 ppm | 749 | 755 |  | 791 |  |  |
| Peroxide value (meq/Kg) | 50 kg bags Ethoxyquin | EQ 300 ppm | 28.9 |  | 9.9 | 8 |  |  |
| EQ 600 ppm | 26.5 |  | 14.3 | 7 |  |  |
| 1000 kg big bag Ethoxyquin | EQ 300 ppm | 27 |  |  | 6 |  |  |
| EQ 600 ppm | 44.3 |  |  | 7 |  |  |
| 50 kg bags BHT blend | BHT 2000 ppm | 36.1 |  | 24.2 | 7 |  |  |
| BHT 4000 ppm | 34 |  | 17.9 | 13 |  |  |
| 1000 kg big bag BHT blend | BHT 2000 ppm | 40.1 |  |  | 10 |  |  |
| BHT 4000 ppm | 31.5 |  |  | 9 |  |  |
| 50 kg bags Tocopherol blend | TocoP 2000 ppm | 28.5 |  | 30.2 | 9 |  |  |
| TocoP 4000 ppm | 43.1 |  | 37.7 | 11 |  |  |
| 1000 kg big bag Tocopherol blend | TocoP 2000 ppm | 42.6 |  |  | 10 |  |  |
| TocoP 4000 ppm | 41.9 |  |  | 12 |  |  |
| Anisidine value | 50 kg bags Ethoxyquin | EQ 300 ppm | 129 |  | 85 | 41 |  |  |
| EQ 600 ppm | 121 |  | 106 | 75 |  |  |
| 1000 kg big bag Ethoxyquin | EQ 300 ppm | 157 |  |  | 40 |  |  |
| EQ 600 ppm | 94 |  |  | 76 |  |  |
| 50 kg bags BHT blend | BHT 2000 ppm | 123 |  | 129 | 33 |  |  |
| BHT 4000 ppm | 146 |  | 92 | 44 |  |  |
| 1000 kg big bag BHT blend | BHT 2000 ppm | 187 |  |  | 52 |  |  |
| BHT 4000 ppm | 131 |  |  | 32 |  |  |
| 50 kg bags Tocopherol blend | TocoP 2000 ppm | 229 |  | 122 | 65 |  |  |
| TocoP 4000 ppm | 142 |  | 130 | 51 |  |  |
| 1000 kg big bag Tocopherol blend | TocoP 2000 ppm | 135 |  |  | 47 |  |  |
| TocoP 4000 ppm | 158 |  |  | 62 |  |  |
| Free Fatty Acids (g/100g) | 50 kg bags Ethoxyquin | EQ 300 ppm | 3.42 |  | 4.02 | 3.9 |  |  |
| EQ 600 ppm | 3.57 |  | 4.11 | 3.7 |  |  |
| 1000 kg big bag Ethoxyquin | EQ 300 ppm | 3.55 |  |  | 3.5 |  |  |
| EQ 600 ppm | 3.18 |  |  | 2.9 |  |  |
| 50 kg bags BHT blend | BHT 2000 ppm | 3.54 |  | 4.7 | 4.3 |  |  |
| BHT 4000 ppm | 3.23 |  | 4.03 | 4.0 |  |  |
| 1000 kg big bag BHT blend | BHT 2000 ppm | 3.59 |  |  | 3.3 |  |  |
| BHT 4000 ppm | 3.03 |  |  | 3.6 |  |  |
| 50 kg bags Tocopherol blend | TocoP 2000 ppm | 3.41 |  | 4.08 | 3.5 |  |  |
| TocoP 4000 ppm | 3.27 |  | 4.05 | 4.1 |  |  |
| 1000 kg big bag Tocopherol blend | TocoP 2000 ppm | 3.28 |  |  | 3.2 |  |  |
| TocoP 4000 ppm | 3.06 |  |  | 2.9 |  |  |
| EPA + DHA (%) | 50 kg bags Ethoxyquin | EQ 300 ppm | 30.6 |  |  |  |  |  |
| EQ 600 ppm | 29.8 |  |  |  |  |  |
| 1000 kg big bag Ethoxyquin | EQ 300 ppm | 30.3 |  |  |  |  |  |
| EQ 600 ppm | 29.3 |  |  |  |  |  |
| 50 kg bags BHT blend | BHT 2000 ppm | 30.1 |  |  |  |  |  |
| BHT 4000 ppm | 27.5 |  |  |  |  |  |
| 1000 kg big bag BHT blend | BHT 2000 ppm | 28.5 |  |  |  |  |  |
| BHT 4000 ppm | 28 |  |  |  |  |  |
| 50 kg bags Tocopherol blend | TocoP 2000 ppm | 27.7 |  |  |  |  |  |
| TocoP 4000 ppm | 28.2 |  |  |  |  |  |
| 1000 kg big bag Tocopherol blend | TocoP 2000 ppm | 28 |  |  |  |  |  |
| TocoP 4000 ppm | 26.5 |  |  |  |  |  |
| Self heating test | 50 kg bags Ethoxyquin | EQ 300 ppm |  |  |  |  |  |  |
| EQ 600 ppm |  |  |  |  |  |  |
| 1000 kg big bag Ethoxyquin | EQ 300 ppm |  |  |  |  |  |  |
| EQ 600 ppm |  |  |  |  |  |  |
| 50 kg bags BHT blend | BHT 2000 ppm |  |  |  |  |  |  |
| BHT 4000 ppm |  |  |  |  |  |  |
| 1000 kg big bag BHT blend | BHT 2000 ppm |  |  |  |  |  |  |
| BHT 4000 ppm |  |  |  |  |  |  |
| 50 kg bags Tocopherol blend | TocoP 2000 ppm |  |  |  |  |  |  |
| TocoP 4000 ppm |  |  |  |  |  |  |
| 1000 kg big bag Tocopherol blend | TocoP 2000 ppm |  |  |  |  |  |  |
| TocoP 4000 ppm |  |  |  |  |  |  |