

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.

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							