



SyneROX 4

Better
oxidation
management
for fish oils

Fish lipids are highly susceptible to oxidation due to high levels of polyunsaturated fatty acids (30-40 %), including eicosapentaenoic acid (EPA) (5-12 %) and docosahexaenoic acid (DHA) (10-26 %). The rate of fish oil oxidation is significantly different from that of other oils.

Various factors govern the oxidative reactions that occur at centers of unsaturation. In addition to being affected by temperature and the degree of unsaturation, oxidation may also be accelerated by various catalytic agents.



Oxidation of lipids not only results in rancid odors and flavors of fish oils, but can also decrease nutritional quality and safety by formation of secondary oxidation products like biologically active carbonyl compounds, including acrolein, malonaldehyde and 4-hydroxyl-2-nonenal.

To help prevent or slowdown oxidation problems, Frutarom is offering specialty oxidation management solutions from SyneROX family, as presented in Table 1.

Table 1: SyneROX Fish oil Application Areas

TYPE	PRODUCT	RECOMENDED USAGE LEVEL	APPLICATION	*NOTE
Fish oil EPA/DHA = 1:1 Fish products	SyneROX 4 (302147)	1 g/kg	Pour into oil and mix well	Higher concentrations, more than 1,2 g/kg, recommended when fish oil used as food supplement.
Fish oil EPA/DHA = 1,5:1	SyneROX 4 (302081)	1 g/kg	Pour into oil and mix well	Higher concentrations, more than 1,2 g/kg, recommended when fish oil used as food supplement.

Test protocol

EPA/DHA 1:1

Materials with antioxidative properties used:

- » SyneROX 4 (302147) at 0,12 % and 1,0 %,
- » natural mixed tocopherols at 0,12 % and 1,0 %,
- » competitor's rosemary extract based formulation at 1,0 % (as per specification),
- » BHT and BHA at 0,01 % and 0,02 %, respectively.

Control sample contained no antioxidant.

The oxidative stability was determined by Rancimat test at 80°C.

EPA/DHA 1,5:1

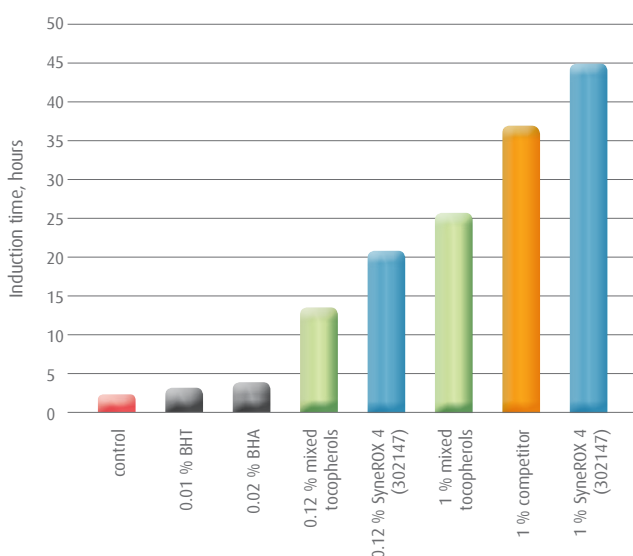
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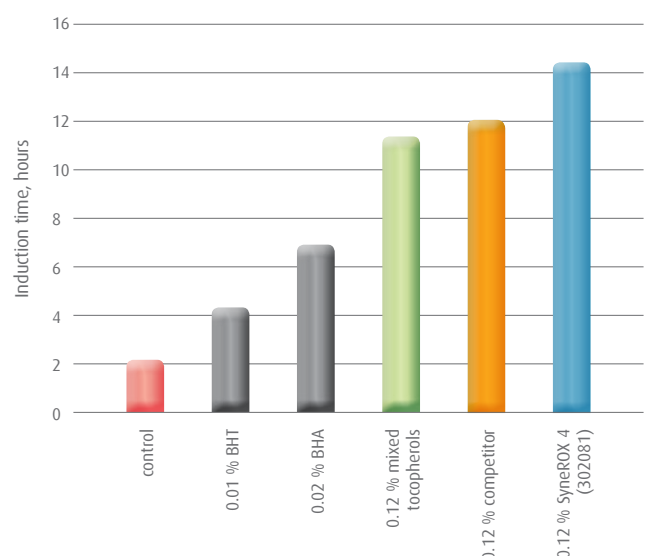
Control sample contained no antioxidant.

Results

Graph 1: Results of rancimat test of fish oil with EPA/DHA 1:1



Graph 2: Results of rancimat test of fish oil with EPA/DHA 1,5:1





Sensory evaluation

A sensory evaluation was performed by a trained panel of seven people. The panel used a descriptive scoring test.

Panelists didn't sense any flavor or taste contribution of rosemary extract in fish oil at a concentration of 0,12 %. Fish oil treated with 1 % of SyneROX 4 (302147) used as food supplement, had no negative sensory impact.

Conclusion

Fish oil EPA/DHA 1:1:

- » Addition of 0,12 % of SyneROX 4 (302147) provides:
 - up to seven-fold better oxidative stability comparing to non-protected material,
 - up to two-fold better oxidative stability comparing to material protected with tocopherols,
 - up to five-fold better oxidative stability comparing to material protected with BHA/BHT.
- » Addition of 1,0 % of SyneROX 4 (302147) provides:
 - up to fifteen-fold better oxidative stability comparing to non-protected material,
 - up to two-fold better oxidative stability comparing to material protected with tocopherols,
 - up to ten-fold better oxidative stability comparing to material protected with BHA/BHT.

Fish oil EPA/DHA 1,5:1:

- » Addition of 0,12 % of SyneROX 4 (302081) provides:
 - up to five-fold better oxidative stability comparing to non-protected material,
 - up to two-fold better oxidative stability comparing to material protected with tocopherols,
 - up to three-fold better oxidative stability comparing to material protected with BHA/BHT.

No negative change of organoleptic properties was detected.

Benefits

Benefits of using SyneROX 4 solutions for fish oil applications are:

- » extraordinary shelf life extension,
- » fresher taste of the treated products,
- » better oxidation management and product market positioning,
- » no organoleptic change of the treated products.

Regulatory

- » For legislation status and additional labelling advices, please contact us at foodprotection@frutarom.com.





FOOD PROTECTION



Vitva

Nova vas pri Markovcih 98
2281 Markovci
Slovenia

tel: +386 2 7888 738

fax: +386 2 7888 731

e-mail: foodprotection@frutarom.com

www.vitva.eu