Improving oxidative stability of liquid fish oil supplements for pets

Omega-3 polyunsaturated fatty acids have produced beneficial health effects in animals and are recommended by veterinarians to pet patients suffering from osteoarthritis. However, these oils are highly susceptible to lipid oxidation. The objectives of this study were to improve oxidative stability of fish oil by adding vegetable oils, mixed tocopherols and rosemary extract, and to formulate a commercial product according to the results obtained. The formulated product was evaluated against commercial fish oil products. An initial screening for antioxidative effect was performed by using OxiPRES equipment. The effect of antioxidant and vegetable oil blends was examined in oils stored at 30 and 40°C by measuring peroxide value, volatile compounds with GC-MS and tocopherol content. Addition of vegetable oil and rosemary extract at high level (4000–6000 ppm) plus 600 ppm of mixed tocopherols increased oxidative stability to the same extent as 2000 ppm mixed tocopherols in OxiPRES. Overall, oxidative stability of fish oil or fish oil + vegetable oil blends was improved the most by addition of 5000 ppm rosemary extract and 500 ppm mixed tocopherols. A commercial oil blend with composition optimized based on the results of this study performed better than other commercial marine oils tested.

Practical applications: In some commercial oil blends for pets, a high level of vegetable oils is included in order to increase oxidative stability. In this study, vegetable oils are included at 30% level. At this level of vegetable oil inclusion, the omega-3 EPA and DHA content of the blends is at least 21% of total fatty acids for both fish and tuna oil based blends. In this study we wanted to examine, whether we could reduce the level of vegetable oil inclusion without compromising oxidative stability. This study demonstrates how the oxidative stability of omega-3 PUFA formulations for pets can be improved by combining fish oil with vegetable oils and by adding an antioxidant blend consisting of high concentrations of rosemary extract and tocopherol. The results are also of relevance to the manufacturers of dietary supplements.