



Oxidation and antioxidants



Oxidation causes a deterioration in the quality of both food and animal feed, resulting in the loss of freshness. This becomes apparent through the loss of flavour, an increase in unpleasant odors, color loss and an ultimate loss of nutrition.

Oxidation affects the quality of many food and feed products, from fish oil and sauces, to meat, pet food, feed premixes and personal care products such as cosmetic creams. Antioxidants, when applied correctly, can delay oxidation, but it cannot be stopped. It's therefore important to add the right antioxidant as soon as possible in the process.

Means of oxidation

Induction of oxidation in sensitive compounds such as fats, colors, flavours and fragrances can be of two means:

1. Autoxidation

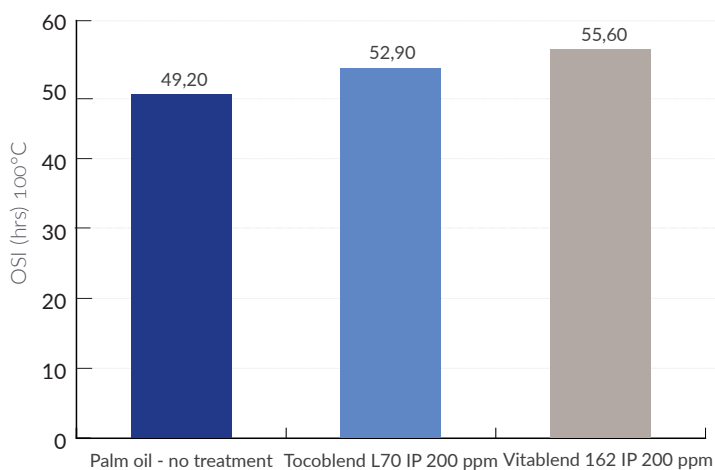
Fats produce unpleasant, organoleptic compounds as a result of exposure to oxygen. The presence of light, heat, moisture or other factors accelerate this process.

2. Hydrolytic rancidity

Moisture, catalytic agents or enzymes such as lipases induce hydrolytic reactions giving rise to free fatty acids which in turn produces autoxidation.

Prevention of oxidation

Improvements in the manufacturing processes such as reducing a product's exposure to heat, light and air can help



Relative OSI of palm oil treated and untreated with antioxidant

delay the onset of oxidation. Improved packaging, which is light resistant or impermeable to air can also delay the oxidation process. These improvements often need the help of antioxidants to secure the freshness desired.

Synthetic and natural antioxidants

Antioxidants are compounds mostly of a phenolic structure which provide their antioxidant property. For decades synthetic compounds such as BHA, TBHQ and BHT have been used as cost-effective antioxidants. Tocopherols, extracts of rosemary and green tea, are very effective natural alternatives.

Although more expensive than synthetic antioxidants and not always as effective at similar application rates, natural systems can be used to equivalent

antioxidant effect. By employing more than one natural system together it is possible to gain cost-effective antioxidant action.

Measuring oxidation

An ability to measure the success of an antioxidant can be achieved in many ways. The Oxidative Stability Index (OSI) is the measure applied. This can be measured under accelerated conditions, such as additional heat and air, with and without an antioxidant. This type of system is quick and helps indicate the success of an antioxidant without the wait associated with a real time sensory test.