



# Synthetic Antioxidants For Foods

Free radicals are involved in ageing of humans in many situations. One source of free radicals is our daily food, where radicals are formed as result of oxidation of oils and fats. A variety of antioxidants are available to the food industry in order to delay this oxidation and so preserving nature's healthy aspects of food. Vitablend offers an extensive range and is available to help select the best antioxidant for every application. Our specialists and fully equipped laboratory are available to optimise the use of antioxidants in our customers' products.

Oxidation increases at higher ambient temperatures and is catalysed by the presence of heavy metal ions, especially copper. The degree of unsaturation of the oil also influences shelf life, for example oils with a high level of linolenic fatty acid are more prone than those with a higher saturated fatty acid content. Oxidation can be minimized by the presence of anti-oxidants, which inactivate free radicals. Dosages of antioxidants are generally up to 200 mg/kg, based on total fat content.

The largest application of antioxidants is found in the processing of oil seeds into oils and fats where refining removes impurities from vegetable oils. With these impurities natural antioxidants can also be removed from the oils, making the products susceptible to oxidation. A range of synthetic antioxidants are available to restore or even improve the oils natural protection against oxidative degradation and thus increasing their shelf life considerably.

Other use of antioxidants are found in the rendering of animal fats, the meat industry, in baked goods and practically all foods with a high oil content such as mayonnaise and margarine.

## BHA

Butylated hydroxyanisole (E-320) is perhaps the most extensively used antioxidant in the food industry. BHA can be easily applied to foods because of its excellent solubility in fats and oils. It is heat stable and of all antioxidants it has the best carry-through effect into baked foods, providing extended shelf life.

Vitablend offers BHA as powder, flake, tablet, small pack and liquid solution (with or without synergists BHT and/or propyl gallate). Applications include: vegetable oil, frying oil, animal feed, cereals, chewing gum, potato flakes and cosmetic products.

## BHT

Butylated hydroxytoluene (E-321) is a synthetic analogue of vitamin E like BHA and operates by reducing oxygen radicals and interrupting the propagation of oxidation processes. Its volatility at higher temperatures makes it especially suitable for products that are stored at moderate temperatures.

Vitablend offers BHT as fine crystal, small pack and liquid oil solution (with or without synergistic BHA). Applications include: animal fats, chewing gum, animal feed, vegetable oils.

## Highlights

### TBHQ

Tert-butylhydroquinone (E-319) is a general-purpose antioxidant used in many applications. Its strength increases with a higher degree of unsaturation, making it widely used in vegetable oils. Other applications are margarine, fish oil, fried foods, essential oils, nuts, edible animal fats, butterfat and packaged fried foods.

Vitablend offers TBHQ as powder and as liquid solutions with or without added synergists to improve antioxidant capability.

### Propyl gallate

Propyl gallate (E-311) is made from natural gallic acid and shows excellent antioxidant activity in foods and vegetable oils, especially in combination with ascorbyl palmitate. It is also synergistic with BHA. Propyl gallate shows lower solubility in oils compared to BHA and BHT.

Vitablend offers propyl gallate as powder and as a liquid solution (with or without other synergistic antioxidants and citric acid).

### Oxidation: Three steps

- Initiation: formation of free radicals from a fat molecule, promoted by the presence of heavy metals in the oil, or by heat or light. Slowed down by primary antioxidants.
- Propagation: reaction of the free radical with oxygen to produce a peroxide free radical, which can react with another triglyceride to produce a hydro peroxide and more free radicals
- Termination: free radicals collide and neutralize each other.

### Antioxidants: Three steps

- Primary: phenolic compounds that are oxidized instead of the oil. BHA, BHT, TBQH, tocopherols
- Secondary: compounds that inactivate oxygen. Ascorbic acid, ascorbyl palmitate.
- Tertiary: chelators, compounds that remove iron and copper traces, citric acid, EDTA.

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