Vitae Caps: Antioxidant systems

The main aim of Vitae Caps is maximizing effectiveness in oxidation prevention, for this reason is researching and developing a range of antioxidant synergists.

This new Vitapherole® range consist of primary and secondary antioxidants with chelating agents to avoid oxidation problems of food industry such as change in physical characteristics of finished product.

Vitae Caps' assay is focus on preventing oxidation and degradation of vegetable oils, fish oils rich in Omega 3, animal fats, etc.

Food, nutraceutical and cosmetical preparations contain lipid substances as vegetable or animal fats and oils, which are rather sensitive to oxidation process. During manipulation, chemical treatments, storage, etc. oxidation causes that fat and oils become rancid, altering physical-chemical and organoleptic properties (colour, odour and flavour). This process is really remarkable in unstable oils such as fish oils, which get rancid very quickly and their organoleptic features are affected.

Oxidative rancidity is consequence of polyunsaturated fatty acids oxidation, and first compounds generated from primary oxidation are hydro peroxides, which polymerize and decompose forming secondary oxidation products such as aldehydes, ketones and acids with less molecular weight. This process is accelerated under specific conditions as light, temperature, humidity and the presence of cupric and ferric traces as inorganic catalysts.

Oxidative volatile compounds are responsible of flavours, off odours like rancid and undesirable tastes of foodstuffs.

European regulation has limited last years several synthetic antioxidants in food, because of that there is a trend of substitution synthetic antioxidants for natural ones.

Primary and secondary antioxidants

Antioxidants are classified in primary and secondary. Primary antioxidants act during all oxidative process. Their antioxidant capacity is explained by their molecular structure with substitution positions. They are capable of donating a single electron or hydrogen atom to free radicals. Even though donating an electron, intermediate compounds are less reactive and more stable as they are able to do delocalization (bonding electrons are distributed among more than two atoms). Furthermore, antioxidants scavenge lipid peroxide radicals and generate a lipid-antioxidant complex. (See figure 1).

Secondary antioxidants sequester oxygen and chelating agents, avoiding and reducing free radicals formation through the following mechanisms:
- Donating electrons or hydrogen atoms to antioxidant primary radicals and consequently, regenerating it.
- Creating acids, which increase stability of primary antioxidants.
- Chelating metal ions, preventing metal-catalyzed reactions so.
- Neutralizing singlet oxygen.
- Sequestering oxygen.

- Decomposing hydro peroxides into non-radical species.
- Absorbing ultraviolet radiation.

These properties of secondary antioxidants enhance shelf life of primary antioxidants and their activity. Because of the synergists of combination primary and secondary antioxidants, the reduction of oxidation improves compared with...
Natural antioxidants: Mixed tocopherols

Mixed tocopherols are considered natural antioxidants par excellence. They work in two different ways:
1. Preventing autoxidation process by reducing the rate of chain initiation. Tocopherols compete as substrate oxidation with polyunsaturated fatty acid radicals generated by free radicals and form their own radical structure stabilized by resonance.
2. Extending induction period and reducing oxidation rate according to temperature by means of irreversible bond to singlet oxygen and generating a range of oxidative tocopherol products (hydroperoxidenone and other endoperoxydes).

Vitae Caps' antioxidant systems and services

Vitae Caps develops tailor-made formulations according to R&D department experience with natural antioxidants like mixed tocopherols (Vitapherole) and blends of primary and secondary antioxidants and chelating agents.

Vitae Caps evaluate its antioxidant systems in customer’s fats and oils doing several tests. Thus, we can offer to the customer the most suitable synergetic agent to avoid primary and secondary oxidation. Analytical methods used to determine its efficacy are:
1. Primary oxidation products are measured with peroxide value test. Peroxide value is widely used to measure oxidative level of fresh oil and to determine the extent to which spoilage has advanced. It is defined as the amount of peroxide oxygen per 1 kilogram of fat or oil.
2. p-anisidine value is used to measure secondary oxidation products. It is important to do p-anisidine test because peroxide value indicates the actual oxidative status in fat matrix and anisidine value indicates its history from the oxidative point. P-anisidine number is correlated with the presence of aldehydes derived from the second oxidation fats.
3. TOTOX number is the combination of peroxide value and p-anisidine value. Totox = AnV+(2xPV) (See figure 3)

Vitae Caps’ antioxidant systems prevent and slow down oxidation process in fats and foodstuffs. Our antioxidant systems are made of natural products in order to offer to the food market a healthy product. Different applications need different antioxidant solutions and Vitae works close to the customer.

Vitae Caps products meet customers requirements and have the following properties:
- Safety and harmlessness
- Quantity added does not effect either colour, smell or flavour in final product
- Effectiveness in low concentration
- Kosher and Halal certified
- Cost-effective
- Optimum performance from initial stages of oxidation mechanism
- Non GMO/IP
- Permitted additive according to European Regulation

Vitae Caps S.A.C/Gutemberg 356, Poligono Torrehiero 45600 Talavera de la Reina, Toledo, Spain
Tel: +34 925 851013
Fax: +34 925 851021
Email: commerce@vitaecaps.com
www.vitaecaps.com