

Balance Between Polyunsaturated Fatty Acids and Antioxidants in Nutrition

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Antioxidants are essential in foods and feeds where highly oxidisable PUFA, such as LnA, EPA, and DHA are to be incorporated.. Indeed, the amount of vitamin E needed by the body depends on the degree of unsaturation in the increased intake of fatty acid that n-3 fatty acid rich foods and feeds need to be accompanied by more vitamin E than generally consumed. For product stability, vitamin E tocopherols, also the major lipid-soluble antioxidant, are generally inefficient. Tocopherols need to be potentated by more complex antioxidant strategies involving other phenolic antioxidants as well as other molecules that synergise antioxidant actions, e.g. phospholipids, peptides and certain proteins. In general natural raw materials containing n-3 fatty acids are protected by sufficient amounts of different antioxidants. New technologies including micro-encapsulation and/or modified atmospheric packaging aiming to minimise product interaction with oxygen are foreseen to be very useful in these applications.

Once n-3 PUFA are successfully incorporated in food and feed products of acceptable sensory quality, other ingredients containing compounds with complementary biological activities can be used as adding-value ingredients. For example, β -glucan fibres, plant sterols/stanols, lignans, and certain phenolic compounds with cholesterol-lowering properties may be added to potentate the beneficial effects of n-3 PUFA. In addition, several other bioactive compounds in foods and residual sources were shown to have health-promoting effects through mechanisms involving ligand binding and nuclear signalling.