MEAT SPOILAGE: OXIDATIVE RANCIDITY

All oils are fats, but not all fats are oils… The decomposition of fats, oils and other lipids can occur either through hydrolysis, oxidation or both. Hydrolytic rancidity is caused by a catalyst driven reaction between the fats and water or through the action of lipase enzyme. On the other hand, oxidative rancidity involves the interaction of fats and oxygen during storage. Extend of hydrogen saturation of the fatty acids determine the state of fats (saturated fats are solid and unsaturated oils are liquid at room temperature). The more unsaturated a fat is, the faster it will oxidize (become rancid). Since oxygen is eight times more soluble in fat than in water, it is the primary driver of oxidative rancidity. The complex chemical oxidation reactions decrease the sensory quality (i.e., unpleasant, noxious odors and off-flavors, functionality, as well as nutrient value (i.e., fat-soluble vitamins, especially A and E) of foods. Oxidative rancidity in foods (and feeds) is an irreversible process that can be reduced significantly by reducing oxygen (packaging) and storing food products in a dark place, as exposure to heat and light accelerates the oxidation reactions. Heat can drive oxidation, but unless frozen, cold storage alone does not reduce the rate of oxidation significantly. The addition of natural (flavonoids, polyphenols, ascorbic acid; Vitamin C and tocopherols; Vitamin E) and synthetic (butylated hydroxyanisole; BHA, butylated hydroxytoluene; BHT, propyl gallate and ethoxyquin) antioxidants can significantly retard rancidity development in meat products. The extend of fat/oil rancidity is quantified by Peroxide Value, where as Thiobarbituric Acid Reactive Substances (TBARS) can be used as a tool to assess rancidity development in prepared foods.