

Effects of Isomerization and Polyene Structure of Fish Oil on Its Oxidation Depth and Physical Properties in Oxidative Process

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Abstract: Fish oil has always been the main materials to produce fatliquor. It's the most appropriate to be oxidized-sulfited for its high iodine value by traditional oxidative theory. Iterative experiments have proved that the iodine value of fish oil is very high in common natural oils and fats. However, compared with vegetable oils with medium or low iodine value (IV), fish oil's peroxide value (PV) is lower in the oxidized process. The effect on the depth of oxidation by the unsaturated characteristic structure of the fish oil and its changes during the oxidation process was confirmed by FTIR, UV and RAMAN.

Experiments have proved that when fish oil was oxidized, both the new conjugated double bonds were formed by the action of free radical O•:

1) The relative displacement of the isolated double bonds () were changed to form conjugated double bonds ();

2) The independent double bonds () were changed to form the new conjugated structures (.

There is no doubt, these changes had restrained the deep oxidation of the high-IV fish oil, and were prone to make great changes for the properties of the oxidized fish oil.

Experimental results have shown that it's not a good choice to use fish oil to produce oxidized-sulfited fatliquor based on the effectiveness of its reaction. As matter of fact, the decision for the depth of oxidation (high PV) of oil and fat is not only related to IV but, more importantly, to the types of the double bonds.

Key words: Unsaturated Natural Oil and Fat, Fish Oil, Peroxide Value (PV), Oxidation