

# Effects of temperature and humidity and effectiveness of some selected antioxidants on lipid oxidation of fresh Nile tilapia (*Oreochromis niloticus* L.) of Lake Victoria, Kenya

Abstract.

Spoilage of fish and its related products due to oxidation is a primary problem leading to both losses in income and environmental degradation. Various methods such as sun-drying, smoking and refrigeration as currently used to prevent such losses are either costly, unavailable to the intended users or ineffective. In addition, the anti-oxidants available in the market to mitigate losses occasioned by oxidation to the fish are mainly artificial and yet to be optimized for *Oreochromis niloticus*. This study quantified the interactive effects between the storage temperature and ambient humidity and the effectiveness of Citric acid, Vitamin E (tocopherol), Rosmarinic acid, Propyl gallate and Vitamin C in arresting fish tissue oxidation. This study observed the fish, starts to rot from the head and this spoilage could only be controlled by temperature at low to medium humidity (< ca. 35 %) values. At high humidity, ca. 65%, the rate of spoilage was purely humidity controlled. The effectiveness order of Vitamin E  $\geq$  Rosmarinic acid > Propyl gallate > Citric acid > Vitamin C was realized and their molecular rotatable bond counts and the kinetic diameters were the most influential properties. Thus, for effective storage, separating the head from the rest of fish and doing the refrigeration in less humid environments is recommended. The relative efficacy of the anti-oxidants could be predicted by evaluation of their relative rotatable bond counts and the kinetic diameters.

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