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RESEARCH ARTICLE

Impact of natural antioxidants (ascorbic acid and citric acid) and vacuum packaging on lipid oxidation in frozen Asian cat fish, *Clarias batrachus* (Linn.)

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ABSTRACT - This study dealt with effects of ascorbic acid (AC) and citric acid (CA) on lipid oxidation in comparison with effect of vacuum packaging in order to find better treatment to delay improper changes in the Asian catfish during frozen storage due to lipid oxidation .In this study traditional packaging, vacuum packaging, ascorbic acid solution (0.5 %) and citric acid solution(0.5%) were considered as treatments. Rancidity development was measured by several biochemical indicators including free fatty acids, peroxide values etc. Also pH and other sensory properties were measured during initial stage of storage. This has been showed from results that free fatty acids(FFA),primary and secondary oxidation products were significantly higher than those in other treatments ($p<0.5$). However, both antioxidants (AA and CA) extended the shelf life of frozen catfish *Clarias batrachus* but rancidity development in CA treated samples were higher than other samples during storage. It has been showed that the usage of AA and vacuum packaging had the best effect on delaying lipid oxidation and increasing shelf life of *Clarias batrachus* ($p<0.5$).

KEY WORDS - *Clarias batrachus*, Antioxidants, Citric acid, Ascorbic acid, Vacuum packaging, Rancidity.

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INTRODUCTION

Fishes are used by human beings from time immemorial in different forms. Fishes are rightly considered as "poor man's" diet, because of their high content in polyunsaturated fatty acids. These unsaturated fatty acids are highly susceptible to oxidation. Deterioration of the fat is not the only improper effect of oxidation and this process can cause some changes in colour, texture, and flavour of the product (Baker, 2001; Hamre and Sandnes, 2003). During storage of fish, lipid oxidation is a critical point ,because it decreases quality and nutritive value of fishes. Different methods have been used for extending fish product shelf-life such as low temperature storage, drying, salting, proper packaging and glazing with solution of protecting chemicals and use of special antioxidants .Usage of antioxidants and vacuum packaging have the best impact on increasing shelf-life and delaying improper changing in sea foods. Antioxidants block the formation of free radicals and thus slows down oxidation and rancidity development. Ascorbic acid and citric acid and their salts are widely known for their role as chelators. The effects of AA and CA on fish oil and other parts have been observed. The another way for delaying lipid oxidation is the vacuum packaging, because of limited oxygen molecule. According to Anelich *et al.* (2001), Fagan and Gormley (2004), packaging under vacuum has positive effect on extended shelf-life of *Clarias batrachus*. It is better to use some antioxidants or other preservative methods to extend the shelf-life of *Clarias batrachus*. Thus, in the present study, effects of ascorbic acid and citric acid (natural antioxidants) and vacuum packaging on quality of fish, *Clarias batrachus* were