Effect of Dipping Treatment in γ-PGA on Freshness and Quality of Tilapia during Refrigeration

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ABSTRACT

Live tilapia (Orechromis niloticus) was used as the material in this study. Based on the method of three piece filleting, tilapia was dissected into pieces and grouped into two categories, of which were raw fish fillets (with skin) and skinned fish steaks that had been resized into 3cm×2cm×1cm. Both groups of fish fillets and steaks were soaked with three kinds of solutions by different molecular mass and forms of 0.5% γ-PGA. The solutions used included high molecular weight (HM), low molecular weight (LM) and Na+ form Hydrogel (Hy). In addition, fish fillets were also soaked with solutions of 0.5% sodium tripolyphosphate (P) and RO water (R) as the controls. The changes of appearance and freshness of each sample stored at 4°C for 0-8 days were investigated. The results were shown as follows. 1. There was insignificantly change in skin color of tilapia fillets during storage, however, the skin of fillets soaked with γ-PGA were moister than those with P and R. At the 8 – day storage, the meat color of of R and HM fillets appeared to be brown, but that of P insignificantly changed. The result of odor analysis showed relative low scores in both groups in R and HM and the highest score in in P group. After 8-day storage, the losing weight of P fillet showed the highest , and that of LM fillet showed the lowest in this study. 2. Hunter b value of all the fish steaks increased with elongation of storage. At the 7-day storage, R and Hy steaks had the highest and lowest b values of -0.42 and -1.55 in this study, respectively. The results were similar to the changes of appearance and TBA. At the 8 – day storage, TBA value showed the lowest in HM steak (0.088) in this study, and that showed the lowest in R steak (0.147). The results showed that soaking with γ-PGA solution treatment could inhibit lipid oxidation of the fish steaks. The results of VBN values (mg/100g meat) showed that R and P steaks exceeded the hygienic standard at the 7-day storage., and Hy steak still fitted in the hygienic standard at the 8 – day storage. K values of the meats also increased with storage. The meats reached the putrid level at the 6-day and the 7-day storage for R and P steaks, respectively, while K value reached 83.67% for R steak and 73.99% for P steak. Moreover, K value reached 63.79 % for LM steak at the 8-day storage. Moisture levels of the meats decreased during the storage period. Both HM and LM had higher moisture contents. The levels of water-soluble proteins of the meat decreased with increasing the length of storage period. R (1.85)and HM (1.76)had significantly decreases at the 4-day storage, but for the LM (1.86) group the significant decrease happened at the 7-day storage. 3. In summary, dipping in γ-PGA solution is practicable for tilapia preservation based on the positive results in analysis of VBN, K value, TBA value, and the changes in weight loss and appearance. LM group and Hy group resulted in better quality in freshness of fish meats and are potential replacements for polyphosphate.

Keywords : γ-聚麩胺酸 ; 吳郭魚 ; 鮮度與品質

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