

EFFECT OF ALKALI WASHINGS ON THE QUALITY OF BLACK TILAPIA FILLETS

B. Jamilah, A.K.M. Mohsin, S.F. Lam, Y. Anida, S. Jinap, A.R. Rüssly and Y.B. Che Man

Faculty of Food Science and Biotechnology
Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor, Malaysia

Keywords: alkali washings, black tilapia, sensory, quality.

Introduction

In the last few years, aquaculture is the main contributor to the increase in the landings of fish world-wide. Some freshwater fish and black tilapia in particular have strong muddy odour and flavour which is mainly due to their eating habits. These muddy characteristics are mainly attributed to the presence of geosmin and 2-methylisoborneol in the fish muscle. At present, no reports have been made available as to the method of reducing or removing of this component during the on-line processing of freshwater fish. The current practice is to hold live fish for several days or weeks in clean water prior to processing. The project has the objective of identifying pre-processing procedures such as washing to reduce this earthy component and thus rendering the end product to be more marketable. Additional benefits of the procedure identified such as increase in the whiteness of the muscle (an important index in fish quality) is also taken into account. Other quality attributes of the fish are also noted to determine the total effect of the treatment on the overall quality and the acceptability of the fish under different handling conditions such as during frozen storage.

Materials and Methods

Live tilapia are brought to the faculty laboratory and killed by a sudden blow on the head. This is to ensure extreme freshness of the starting material. They were then split into experimental lots for various treatments. Washings with various concentrations of NaOH and KOH solutions for 5 to

20 min were carried out. After which they were rinsed in distilled water to remove any residue of the washing solutions. The efficacy of the washing treatments was examined at two different levels. One, on more general aspects such as sensory characteristics, texture and color instrumentally; the other, on the molecular level whereby the denaturation of the myofibrillar protein and volatile and the non-volatile components of the muscle was determined. The effect of the treatment on the lipid stability of the fish was also investigated.

Results and Discussion

The overall results indicate that the alkali washings could reduce the muddy component in the fish muscle within 5 to 10 min washings depending on the strength of the solutions used. Colour of the exposed surface of the fillets also increase in whiteness according to the Hunter colour scheme. However, increasing the concentration of the NaOH solution greater than 0.5N will result in denaturation of the muscle and a change in the colour of the surface area. A strong correlation was also obtained between the instrumental texture reading and the texture response from the sensory evaluation. This apparent observation is supported by changes in the thermogram (Differential Scanning Colorimetry) of the actin and the myosin component and the solubility characteristics of the myofibrillar protein. Confirmation of the pattern of denaturation of the myofibrils by SDS-PAGE is currently pursued. Difficulty is encountered in getting the bands due to the low concentration of the myofibril extract. Lipid being the next important component in the fish muscle and mainly existing in the relatively unsaturated form is also crucial in deciding the usefulness of the whole experimental exercise. The peroxide and TBARS values, the fatty acids profile and FTIR characteristics are currently compiled.

Conclusions

The alkali washings of the fish muscle is effective in reducing the muddy flavour and odour of the fish muscle. However, washings should not be carried out with very strong alkali solutions since it is detrimental to the texture and the colour of the sample thus indirectly affecting its marketability.