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Performance Evaluation of colorimetric nano-sensor aminated graphene oxide- bromophenol blue based on Whatman paper in determining oxidative quality of fish feed kept in cold storage condition

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Abstract

In the present study, to evaluate the oxidation quality of fish meal stored at refrigerator temperature for 6 months, a colorimetric nano-sensor aminated graphene oxide - bromophenol blue based on Whatman paper was used. The results showed that the amount of moisture increased from 7.19% to 9.37% and ash content increased from 7.29% to 8.04% during storage ($P < 0.05$). The amount of changing in fat and protein contents showed that fat content decreased from 12.87% to 10.53% and protein content decreased from 54.51% to 52.37% and showed decreasing trend during the storage period ($P < 0.05$). Peroxide value (PV) increased during the period, and the maximum amount of that was at the end of the storage period with 6.1 meq O_2 /kg lipid ($P < 0.05$). The amount of thiobarbitic acid (TBA) showed increasing trend and finally reach to 3.86 (mg MAL/kg meal) ($P < 0.05$). The color changes (ΔE) of the used nanosensor increased during storage period and changed from 29.04 to 52.67 ($P < 0.05$), and also changed from green to blue and detectable by the naked eye. Pearson correlation coefficients between PV and TBA indices with color changes index (ΔE) were 0.93 and 0.89, respectively. The results of this study suggest that the use of colorimetric nano-sensor aminated graphene oxide - bromophenol blue based on Whatman paper with a simply color change process can be a novel approach in determining the oxidative quality of fish feed during storage.

Keywords: Fish feed, Lipid oxidation, Nano-sensor, Quality determination

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