

Pomegranate Peel Powder as a Natural Preservative Enhances the Microbiological Quality, Oxidative Stability and Shelf-Life of Aquafeed During Ambient Storage

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Abstract

This study was conducted at the Aquaculture Unit, College of Agriculture, University of Basrah, to evaluate the effect of dietary pomegranate peel powder (PPP) supplementation 0, 10, 20, and 30 g/kg feed treatments (T₁–T₄) on the microbiological quality and shelf-life of fish feed stored at ambient temperature (25 ± 2°C) for eight weeks. Results showed that total bacterial count in the control (T₁) increased from 0.12 × 10³ to 9.8 × 10⁴ CFU/g by week 8, while T₄ remained as low as 2.1 × 10³ CFU/g; mold and yeast counts decreased from 3.2 × 10³ CFU/g (T₁) to 4.3 × 10¹ CFU/g (T₄), a reduction exceeding 99% and coliform bacteria, detected in T₁ from week 3 and reaching 14.00 × 10² CFU/g by week 8, remained below detection in T₄ until week 4 and never exceeded 0.05 × 10² CFU/g. Regarding oxidative deterioration, free fatty acid content rose to 4.87 ± 0.18% in T₁-surpassing the 4.0% EFSA/FAO limit, while T₄ maintained a significantly lower value of 1.80 ± 0.08%, 63% reduction; similarly, TBA values increased from 0.25 to 3.21 ± 0.12 mg MDA/kg in T₁, exceeding the 3.0 mg/kg acceptable limit, whereas T₄ stayed at 0.74 ± 0.03 mg MDA/kg, a ~77% reduction relative to control. Overall, dietary supplementation with 20–30 g/kg pomegranate peel powder effectively improved the microbiological quality and oxidative stability of aquafeeds during storage, supporting its potential as an economical, sustainable, and environmentally friendly natural preservative that could replace synthetic preservatives in aquafeed formulations.

Keywords: Fish diets, Pomegranate peel, Shelf life, Aspergillus spp.

