

Evaluation of Applewood Extract as a Natural Antioxidant in Emulsified Meat Products

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The growing demand for natural and sustainable food additives has driven research into alternatives to synthetic antioxidants. This study investigates the potential of applewood extract (AE), a polyphenol-rich product obtained through ultrasound-assisted extraction, as a natural antioxidant in emulsified meat products, with particular focus on liver pâté. The antioxidant capacity of AE was tested both individually and in combination with sodium nitrite (NaNO_2), a commonly employed stabilizer in the preparation of liver pâté. These results were subsequently compared to formulations containing NaNO_2 and butylated hydroxytoluene (BHT), an extensively utilized synthetic antioxidant. Liver pâté formulations were stored at 4 °C for 10 weeks, with analyses conducted at six time points. Primary oxidation products, hydroperoxides, were quantified using the FOX assay, while secondary oxidation products were profiled using HS-SPME-GC-MS. Additionally, the evolution of the polyphenolic compounds in AE-treated meat products was evaluated by UPLC-DAD. pH changes were also monitored to assess the overall quality of the product. In both formation of hydroperoxides and secondary oxidation products, the control formulation, which included BHT and NaNO_2 , exhibited the highest oxidative stability, maintaining minimal oxidation levels throughout the storage period. Liver pâté stabilized with NaNO_2 individually showed limited antioxidative protection after 4 weeks of storage, leading to oxidative degradation. The combination of AE and NaNO_2 demonstrated improved oxidative stability compared to the use of NaNO_2 as individual stabilizing agent, although it was less effective than the control. UPLC-DAD analyses revealed a time-dependent decline in polyphenolic content in AE-treated liver pâté, indicating that polyphenols were actively consumed during the oxidative process. These findings demonstrate the potential of AE as a natural antioxidant, particularly when combined with nitrite, offering a more sustainable approach to enhancing the oxidative stability of emulsified meat products.