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Antimicrobial activity of grape seed and skin extracts coated on corona treated LDPE and PET films

Nahla Mohamed Abdel Khalek Khalil
The American University in Cairo, Egypt

Incorporation of natural bioactive agents in the packaging material to increase the shelf life of meat products is a promising technology. Grapes are of special interest because of their high content of phenolic compounds that have documented antimicrobial and antioxidant properties. The aim of the present work was to investigate grape seed (GSE) and skin (GSKE) extract antibacterial activity through their incorporation into bioactive LDPE/PET films that could be used as food packaging materials for poultry and meat products. Commercial corona treated LDPE and PET were coated with either grape seed or grape skin extract. The agar plate diffusion method was used for the investigation of the antimicrobial properties of both extracts' coated films against *E. coli* chosen as a Gram-negative bacterium and *Staphylococcus aureus* as a Gram-negative one. LDPE and PET films coated with GSE showed inhibition zones of *E. coli* growth in the range of 16-25 mm, while *S. aureus* growth inhibition zones were in the range of 15-20mm. For LDPE corona films coated with GSE, the Minimum Inhibitory Concentration (MIC) was 0.1 gm for *E. coli* and 0.15 gm for *S. aureus*; while for corona treated PET films/GSE, the MIC for both *E. coli* and *S. aureus* was 0.1 g/area of regular petri dish. Corona treated LDPE and PET coated with GSKE showed an inhibition zone range of 13-16.3 mm for *E. coli* and 12-20 mm for *S. aureus*. For LDPE corona films/GSKE, the Minimum Inhibitory Concentration (MIC) was 0.05 gm for *E. coli* and 0.2 gm for *S. aureus*. For corona treated PET films/GSKE, the MIC was 0.1 gm for *E. coli* and 0.15 gm for *S. aureus*. The Total Phenolic Content of both GSE and GSKE was determined to be 315.32 g (GAE)/kg, and 265.326 g (GAE)/kg for GSE and GSKE respectively using the Folin-Ciocalteu method. The coated films (LDPE/GSE or LDPE/GSKE), were used to wrap fresh ground chicken patties. TVC, *Pseudomonads*, *Brochothrix thermosphacta*, Lactic acid bacteria and Enterobacteriaceae counts were determined during a storage period of 10 days. Sampling was carried out on day 0, 2, 4, 6, 8 and 10 for test samples and until day 8 for controls. There was a reduction in the population of the bacteria tested in the range of 0.2-1.4 log cfu/g in case of GSE, while with GSKE the reduction of bacterial populations range was 0.3-1.95 log cfu/g. Chicken patty microbiological shelf life for the LDPE/GSE samples, LDPE/GSKE samples and control samples was 10, 10 and 8 days respectively.

Biography

Nahla Mohamed Abdel Khalek Khalil has completed her MS in Food Chemistry at The American University in Cairo, School of Sciences and Engineering, Chemistry Department in 2017. She is currently working as Research Assistant in the Chemistry Department, The American University in Cairo. She started discussions concerning her PhD with her advisors at The American University in Cairo, she intended to complete her research focusing on the other important aspects of both grape seed and skin extracts e.g. anticancer and antiinflammatory properties.

nana@aucegypt.edu

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