# EFFECT OF SOME NATURAL ADDITIVES AND EXTRACTS ON QUALITY CHARACTERISTICS OF BEEF SAUSAGE

BY

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# ABSTRACT

## Effect of Some Natural Additives and Extracts on Quality Characteristics of beef sausage

The main goal of this study is to replace industrial antimicrobials and antioxidants that have a harmful effect on human health with plant extracts and natural additives that are not harmful to health, as it was found in many food plants, besides their high nutritional value, have a medicinal and therapeutic benefit as well as they may contain active substances that act as antimicrobials as well as antioxidants, and these plants include bottle gourd and pumpkin, which have been shown to contain biologically active substances.

In this study, the active substances of pumpkin and bottle gourd leaves were extracted using ethanol 50%, and a descriptive detection of the extracts was made, where it was found that they contain (phenols, flavonoids, alkaloids, glycosides, terpenes, saponins, phlobatanins and resins) in addition to the bottle gourd leaf extract containing tannins and steroids, as well as the total content of phenols and flavonoids, were (406 mg gallic acid/ g – 42.6 mg quercetin/ g) and (183 mg gallic acid/ g – 22.1 mg quercetin/ g) of bottle gourd leaf extracts and pumpkin respectively. Also, the antimicrobial activity was studied using the agar well diffusion method and the broth dilution method (MIC and MLC), where it was found that both extracts had an increased antimicrobial activity with increasing concentration, and it was found that the Gram-negative bacteria *E. coli* was more sensitive than Gram-positive bacteria *S. aureus* and *B. subtilis*. The antioxidant activity was studied using DPPH, ABTS, and TAC tests, where it was found that both extracts have antioxidant activity, but bottle gourd leaf extract was found to have higher antioxidant activity than pumpkin leaf extract.

These extracts were added to beef sausage at concentrations of 1%, 2%, and 4%, as well as making two samples by adding bottle gourd and pumpkin pulp fruits at a rate of 10% with a control sample made without additives for review and stored at freezing temperature for 90 days with a storage test each (0, 3, 6, 9 and 12 weeks). The results were, a decrease in the microbial load of the treatments compared to the control was observed, and the amount of decrease increased with the increase in the concentration for the extracts. Also a constant was found in the TBA values for the treatments containing bottle gourd leaf extracts and fruits, and a high stability was found in the TVN values for the treatments containing pumpkin leaf extract and fruits of bottle gourd and pumpkin compared to control, the pH values were higher than for the treatments compared to the control, and total acidity was lower for the treatments compared to the control. It was also noted from the results of the sensory evaluation that the treatments containing bottle gourd pulp were better than the control, while the samples containing bottle gourd leaf extract and pumpkin pulp were close to the control, and the treatments containing pumpkin leaf extract were of the lowest quality. It was evident from the obtained results that these extracts and fruits have a role in reducing the number of microbes, as well as their possession of natural antioxidants that prolongs shelf life of sausage.



**Key words:** Bottle gourd, Pumpkin, Beef sausage, Antioxidant, Sensory evaluation, Frozen storage,