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### The impact of the carotenoid complex of rosehip and hawthorn powders on the accidental pathogenic microbiota in sausages

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One of the problems in the food industry is the food contamination with pathogenic microorganisms of human origin as a result of inadequate handling and processing. Microbial contamination reduces the shelf life and quality of foods that can cause food infections and food poisoning. Because of the bacterial resistance increase to antibiotics, a particular interest has been shown to investigate the antimicrobial effects of natural bioactive compounds against pathogenic bacteria in order to produce harmless foods for consumers. Recent studies have demonstrated that rosehip and hawthorn powders manifested antibacterial effect against *Staphylococcus aureus* and *Escherichia coli*. The purpose of this research was to investigate the antimicrobial properties of rosehip and hawthorn powders against pathogenic microorganisms, *S. aureus* ATCC 25923, *Salmonella* Abony ATCC 6017, *Klebsiella pneumoniae* ATCC 13883 and *E. coli* ATCC 25922 in sausages. In this research we used rosehip (*Rosa canina*) and hawthorn (*Crataegus monogyna*) berry powder that was dried at room temperature. The carotenoid content in powders was determined by spectrophotometric and high performance liquid chromatography (HPLC) methods. The carotenoid content in the hip powder was 18.3 times higher than in the hawthorn powder. Samples of sausages were contaminated with strains of *S. aureus* ATCC 25923, *Salmonella* Abony ATCC 6017, *Klebsiella pneumoniae* ATCC 13883 and *E. coli* ATCC 25922. The growth of tested cultures in situ (sausages), in control samples (with no addition of berries extract), and in the samples with rosehip and hawthorn were determined. Incubation was performed at 37 °C. The rates of growth of pathogenic microorganisms were monitored after 24, 48, 72 and 96 hours. The results of this study showed that the use of rosehip and hawthorn powders in sausage processing had diminished the rate of growth of pathogenic microorganisms on purposely contaminated samples. By studying the Lag phase and the Logarithmic growth phase of the strains, it was found that hawthorn had a greater bacteriostatic effect on *S. aureus* strains ATCC 25923 and *E. coli* ATCC 25922, than on the other microorganisms, while the rosehip had important bacteriostatic effect on *Salmonella* Abony strains ATCC 6017 and *Klebsiella pneumoniae* ATCC 13883.

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