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Masters Thesis

about

Food Wax Wraps (Packaging) as Source of Sustainable Packaging in Terms of Antimicrobial and Sensory Properties

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Abstract

Background: Innovation in food packaging provides countless benefits to society through maintaining the desired quality of food and increasing the shelf life of food products. Sustainable packaging materials include antimicrobial and biodegradable packaging materials.

Aim: This study aims to evaluate the antimicrobial properties of wax wraps against *E. coli, L. innocua* and *B. Subtilis.* Additionally, it aims to find the effects of wax wraps on sensory properties of food such as appearance, odour and taste.

Method: Antimicrobial analysis of three commercially available wax wraps was performed against *E. coli, L. innocua* and *B. Subtilis* with cell suspensions density of approx. 10^4 cells ml^{-1} of agar. Disk diffusion method was used to find out the antimicrobial properties of wax wraps and samples were kept at 30 ±2 °C for 72 hours under aerobic conditions. The zone of inhibition technique was used to evaluate the antimicrobial properties. Where at least 2 out of 9 specimens were creating ≥ 2mm of the zone of inhibition, the packaging materials were considered antimicrobial in nature. In the sensory analysis, samples were prepared with direct contact technique and the different wax wraps were used along with four different test food materials such as cucumber, rice, toast bread and cheese. The different from control test method was used to obtain differences as compared to a control sample, which was used to evaluate the deviation in sensory attributes. Data was analysed with the detection of a threshold method with median score and two statistically significant methods namely Dunnett's multiple comparisons and Mann-Witney U test.

Results: Only one type of wax wrap showed clear zones of inhibition against *L. innocua* and *B. subtilis*. However, the other two wax wraps did not show any zone of inhibition against tested bacteria strains. Results of the sensory analysis showed that all wax wraps did not influence the appearance of all tested food materials. Only the odour and taste of cheese and toast bread were influenced by two wax wraps.

Conclusions: Food wax wraps, according to the findings, offer significant antimicrobial properties and the ability to retain sensory attributes of food. Food wax wraps have the potential to limit the growth of Gram-positive bacteria strains, according to microbial study. In terms of antimicrobial and sensory properties, these findings could not be applied to all currently available food wax wraps. Because the manufacturing process is not uniform in terms of ingredients and sources.

Keywords: Antimicrobial packaging, wax wraps, zone of inhibition, sensory analysis,